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The Psychosocial Characteristics Of Alcoholics In Treatment Who Were Arrested For Driving While Impaired

Scott Arthur Macdonald

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THE PSYCHOSOCIAL CHARACTERISTICS OF ALCOHOLICS IN TREATMENT WHO WERE ARRESTED FOR DRIVING WHILE IMPAIRED

by

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ABSTRACT

The purpose of this study was to explore the relationship between various psychosocial characteristics and Driving While Impaired (DWI) arrests, within a sample of male alcoholics in treatment. Four main groups of variables were studied: socio-demographic characteristics, drinking characteristics, driving characteristics and psychosocial characteristics. People were subdivided into three groups according to their number of DWI arrests in the previous ten years, as determined by self-reports and official driving records: Group 0 had zero DWI arrests, Group 1 had one DWI arrest, and Group 2 had multiple DWI arrests. Two hundred and fifty-eight people completed the self-administered questionnaire.

The results of bivariate analyses showed that Group 0 and Group 1 were practically indistinguishable for the variables investigated and, therefore, they were combined into one group. People in Group 2, however, were signficantly different from people in the other two groups for about one half of the variables studied. People with multiple DWI arrests were significantly more likely than others to be single, lower in socio-economic status, lower in education, and younger. Multiple offenders drank less frequently, but drank greater quantities of alcohol per

occasion and reported higher numbers of most drinks ever consumed in a day. Multiple offenders reported they drove more dangerously after drinking and enjoyed driving in itself more than the others. Finally, people with multiple DWI arrests had more disrespect for authority more undesirable life events and described themselves as less socially desirable. Analyses also showed that the numbers of moving violations or traffic collisions without alcohol involvement were not related to DWI arrests. Finally, multivariate analyses were conducted in order to determine which combinations of variables best explain multiple DWI arrests. Interactions that improved the main effects model were also explored.

The results provided a contribution towards understanding factors related to DWI within a sample of male alcoholics in treatment. Although use of this sample had limitations in terms of reduced generalizability, advantages were achieved. Specifically, use of this more homogeneous group helped improve efficiency and reduced the prospect of confounding due to differences in alcoholism and gender.

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THE PSYCHOSOCIAL CHARACTERISTICS OF ALCOHOLICS IN TREATMENT WHO WERE ARRESTED FOR DRIVING WHILE IMPAIRED[1]

Introduction

In 1985, 34.0 percent of Ontario drivers involved in fatal automobile collisions had blood alcohol concentrations (BAC) in excess of 80 milligrams of alcohol per 100 millilitres of blood (80 mg%) (Ministry of Transportation and Communications, 1985). However, one would expect a maximum of 6.6 percent of drivers impaired by alcohol to be in fatal collisions, based on a recent survey of BAC levels of 9,745 drivers in Ontario (Interministerial Committee on drinking-driving, 1980). Similar observations regarding the disproportionate number of people impaired by alcohol who are involved in traffic fatalities have been reported in the United States (Fell, 1982). At least five case-control studies have been conducted on the relationship between traffic collisions and consumption of alcohol. Virtually every study has shown that as BAC's of people increase over 80 mg%, so does the relative risk of a traffic collision (Council on Scientific Affairs, 1986). Such evidence is consistent with laboratory experiments which show that

[1] See Appendix A for definitions of driving while impaired and other terms used throughout this dissertation.

ingestion of alcohol reduces psycho-motor capabilities (Michell, 1985). The overwhelming evidence is that people who drive while impaired by alcohol represent a problem that has economic, public health and legal implications.

Research designed to identify people who are most likely to be arrested for driving while impaired (DWI) was useful in understanding the nature of the problem. Alcohol dependent people have been identified as more likely than the general population of drivers to be arrested for DWI and to be responsible for alcohol related traffic collisions; however, research has shown that not all alcoholics are equally at risk of DWI or traffic collisions. It is not clear what factors are related to DWI arrests for alcohol-dependent drivers. The purpose of this research was to address this issue within a sample of male alcohol dependent drivers.

It is widely publicized that increased frequency of drinking and driving increases the likelihood of traffic collisions and DWI arrests. It is less well publicized or researched that people may drink and drive with different styles of driving. For example, some people may drive slowly and cautiously when inebriated, whereas others may drive faster and more aggressively in the same state of

intoxication. These different styles of driving may increase or decrease the risk of being apprehended for DWI. Other driving related variables may be associated with DWI arrests. For example, alcoholics who frequently commit moving violations while sober may be more likely to be arrested for DWI. Finally, alcoholics who find driving pleasurable may be more likely to be arrested for DWI.

Very little is known regarding the relationship of different patterns of alcohol use and DWI arrests within alcohol dependent populations. Two variables of interest are amount of drinking per occasion and frequency of drinking. Although it is largely accepted that people arrested for DWI generally consume more alcohol per occasion than people not arrested, it is not known whether this relationship also exists within an alcohol dependent sample. Furthermore, little information exists on the relationship of frequency of drinking and DWI arrests, either in the general or alcoholic populations.

Finally, there is a paucity of information on the relationship of psychosocial variables and DWI arrests for alcoholics. In order to derive a list of variables that may be good predictors of DWI arrests, literature was reviewed on psychosocial variables that have been implicated in

traffic collisions, moving violations or DWI convictions in comparison to drivers from the general population. Numerous psychological characteristics have been identified in relation to traffic collisions and moving violations: aggressiveness (Kraus et al., 1970; Pelz & Schuman, 1973; Willet, 1973), impulsiveness (Mozdzierz et al., 1975; Schuman et al., 1967; Tillman & Hobbs, 1949), depression (Schuster & Guilford, 1964; Selzer, 1961) and antisocial attitudes (Conger et al., 1959; Willet, 1973; Pelz & Schuman, 1973; Schuster & Guilford, 1964). Psychosocial variables such as undesirable life events (Selzer & Vinokur, 1974; McMurray, 1970; Mayer & Treat, 1977) have also been identified as possible determinants of traffic collisions. Socio-demographic variables, such as lower age (Pelz & Schuman, 1973) and lower socio-economic class (Selzer & Vinokur, 1974) are often mentioned. DWI offenders were also found to possess many of these characteristics in comparison to drivers from the general population.

Several types of variables have been identified as possible predictors of DWI arrests. The variables, which were derived from a careful review of the literature, include socio-demographic characteristics, psychosocial variables, drinking related variables, and driving related

variables. One objective of this study was to explore the simple relationships between these aforementioned variables and DWI arrests within a sample of alcoholics in treatment. A second objective was to develop multivariate models that describe the relationship of these variables with DWI arrests.

The results of this study may provide information that can be used to identify alcoholics who are likely to be arrested for DWI. This information could be useful for prevention programs. Treatment programs could be tailored towards affecting the conditions that are found to be associated with drinking and driving. For example, if aggression is found to be associated with DWI, perhaps treatment programs could be tailored towards providing outlets, other than driving, to release this aggression.

CHAPTER 2

Review of the Literature

2.1 Introduction

This review of the literature provided the foundation on which the study was based. There were no studies that were directly relevant, but several studies were useful for designing this study. In the review, several areas were explored. The first topic reviewed involves studies of psychosocial variables associated with two aspects of high risk driving; traffic collisions and moving violations in the general population (section 2.2). These psychosocial variables were later used as the basis for examination of drinking and driving in an alcoholic population. In section 2.3, literature was reviewed on driving behaviours and psychosocial characteristics of DWI offenders compared to the general population. The next section examined driving behaviours of alcoholics. In sub-section 2.4.1, literature on the relationship between alcoholism, DWI convictions, and traffic collisions/moving violations was reviewed. The final sub-section (2.4.2), on the psychosocial characteristics of alcoholics who drive while impaired, established the basis for this research.

2.2 Studies of Psychosocial Variables Associated with Traffic Collisions and Moving Violations (excluding studies with samples of alcoholics).

In a recent review, Cameron (1982:2) has noted that "analyses of the relative contributions of various factors or of interrelationships between factors involved in traffic crashes are relatively rare." Studies that have investigated psychosocial factors in relation to traffic collisions and moving violations are divergent in their methodologies and the questions they investigated. Most studies have compared people with a high frequency of traffic collisions and/or moving violations to people with a lower frequency. The samples include comparisons within the general population and special populations such as bus drivers and airmen. Considerable variability also exists in relation to sizes of samples and type of statistical analyses. Table 1 (Appendix A) lists the relevant studies and includes a description of their samples, samples sizes, statistical tests, and the psychosocial variables that were found to be associated with traffic collisions and/or moving violations.

The psychosocial variables that appear most related to traffic collisions and/or moving violations in the general population and special populations (excluding alcoholics) are described in this section of the review. Variables that have the same or nearly identical meanings, but labelled

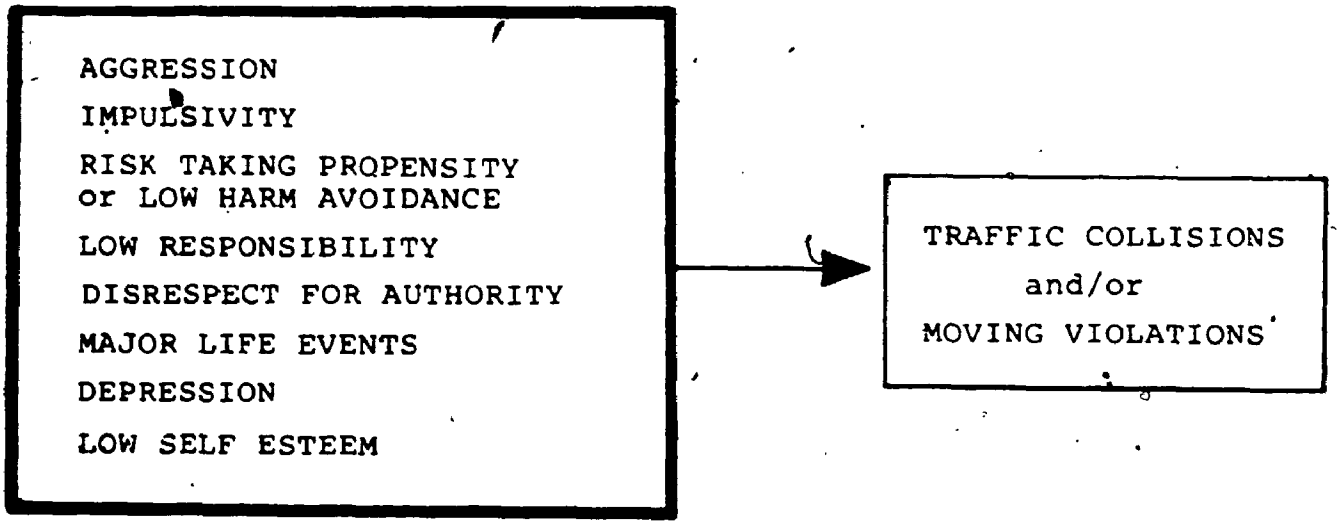
differently, are treated as equivalent. A large percentage of variables found to be associated with traffic collisions or moving violations are representative of an aggressive, antisocial personality. Clinically this personality is unsocialized, irresponsible, aggressive, impulsive, incapable of loyalty, selfish, feels no guilt, and does not learn from experience (Hare & Schilling, 1978). Other variables identified, which do not belong to the above group, are life events, depression, and low self-esteem. Figure 1 presents the list of variables that have been identified.

Aggressiveness

Aggressiveness has frequently been noted in the literature as being associated with collisions and moving violations. Aggression, according to Geen (1976), involves three components: (1) delivery of a noxious stimulus, (2) intent to harm, and (3) a probability greater than zero of being successful. Hostile aggression involves feelings of resentment, suspicion, and is intrinsically reinforced (Buss, 1961). Most studies have focused on hostile aggression in relation to traffic collisions and moving violations.

From Table 1 (Appendix B) it can be seen that six studies have implicated either aggression or hostility as

Table 2.1 Psychosocial variables found to be associated with traffic collisions and moving violations.



possible etiological components of this kind of high risk driving. However, one study found that juveniles with 2 or more moving violations were not different from a control group in terms of aggression (Beamish & Malfetti, 1962). This trait has been identified in relation to both traffic collisions and moving violations.

Aggression may be expressed by operating an automobile in a reckless manner through speeding or other dangerous driving patterns. In one study, it was found that in over 50 percent of traffic fatalities, the drivers were travelling too fast (Bako et al., 1977). Perhaps these drivers were more aggressive than the drivers who have no traffic fatalities.

Impulsivity

An individual who scores highly on this variable often acts without deliberation, vents feelings readily and may be volatile in emotional expression (Jackson, 1967). Terms highly related to impulsivity are: lack of self-control (Shaw, 1965), low frustration tolerance (Tillman & Hobbs, 1949), and intolerance of tension (Conger et al., 1959). Because several authors have described impulsiveness as the inability to tolerate frustration (Buss, 1961; Guilford & Zimmerman, 1956; Eysenck, 1967), these two constructs may be

treated as equivalent. Several authors have identified this characteristic as being highly positively related to traffic collisions and/or moving violations (Shuman et al., 1976; Shaw, 1965; Conger et al., 1959).

Harm Avoidance

Another variable that may be closely related to aggression and impulsiveness is harm avoidance. People scoring low on harm avoidance enjoy exciting activities having an element of danger (Jackson, 1967). Many terms are closely related to harm avoidance such as thrill seeking, risk taking, and experience seeking (Zuckerman, 1971). Harm avoidance was chosen as the most appropriate term because it involves two relevant components: a desire to be adventurous and an element of danger that may cause bodily harm. Thrill seeking and experience seeking may not involve a high degree of danger, and risk taking may involve activities, such as gambling, where chances of bodily harm are minimal.

Operationally, it would follow that people scoring low on harm avoidance would enjoy activities such as speeding and running red lights. They would also not view drinking and driving as an activity to be avoided.

Harm avoidance has not been specifically investigated in relation to high risk driving. However, Jamison and

McGlothlin (1973) found that sensation seeking was significantly associated with moving violations and traffic collisions. Both Harano et al. (1975) and Mayer and Treat (1988) found that risk taking was associated with traffic collisions.

Responsibility

People scoring low on responsibility can be described as: self-centred (Conger et al., 1959), socially irresponsible (Tillman & Hobbs, 1949), insensitive to feelings of guilt (Willet, 1973), irresponsible (Kraus et al., 1970), and socially maladjusted (Schuster & Guilford, 1964). Although these authors used different terms to describe responsibility, they all found that people without this characteristic were more likely to be involved in traffic collisions and moving violations. In operational terms, people who score low on responsibility are less likely to obey traffic laws (including DWI) because they have little respect for others and social rules.

Disrespect for Authority

An extreme form of low responsibility is disrespect for authority, which is usually measured by deviant behaviours such as having a criminal record. Kraus et al. (1970) referred to this as "intolerant of authority" and

Pelz and Schuman (1973) called it "rebellious." Both sets of authors found these characteristics to be related to traffic collisions and moving violations.

Major Life Events

Major life events are "social events requiring change and ongoing life adjustment" (Holmes & Rahe, 1967). Not all life events falling into this category are considered to have a negative impact on the individual involved. Examples of life events are the onset of illness of someone close, new employment circumstances or new living arrangements.

Several studies have shown major life events are significantly related to traffic collisions. Finch and Smith (1970) found that 80 percent of drivers killed in traffic collisions suffered significant stressors within 24 hours of their fatal accidents, whereas only 12 percent in a control group had similar stressors. McMurray (1970) showed that people involved in divorce proceedings had worse than average driving records in the year of the divorce. Selzer and Vinokur (1974) showed some stressful events, such as disturbances with in-laws and/or parents, were related to traffic collisions. Research suggests that undesirable events explain more variation in outcomes than desirable events (Dohrenhend et al., 1978).

Depression

Depression can be described by personal characteristics such as feelings of hopelessness, emptiness, confusion, dissatisfaction, indecisiveness, personal devaluation and associated characteristics such as suicide attempts (Zung, 1965). The onset of depression is often a reaction to negative external situations (Beck, 1973). In some instances depression is a chronic state that may last many years.

A few studies have investigated the relationship between depression and traffic collisions and/or moving violations. Shaw (1965) found that suicidal tendencies and indecisiveness (attributes of depression) were related to traffic collisions. Donovan et al. (1985) showed that drivers with multiple moving violations and traffic accidents were significantly more depressed than a random sample of drivers from the general population. Finally, Selzer (1969) showed that people who die in automobile collisions were significantly more likely to have a history of previous suicidal gestures or attempts, compared to a control group matched for age, sex and residence who didn't die in collisions.

Self-Esteem

People with low self-esteem have low opinions of themselves, lack self-confidence, and feel awkward among people (Jackson, 1976). Mixed results emerge from studies that have examined a relationship between self-esteem and traffic collisions and/or moving violations. Shaw (1965) found that people sensitive to criticism (an attribute of low self-esteem) were more likely to be involved in traffic collisions. On the other hand, two studies showed that high self-esteem or self-confidence was positively related to the likelihood of traffic collisions and/or moving violations (Shaw, 1965; Willet, 1973). Such findings may not be contradictory: people with a more average range of self-esteem may be the best drivers while those with either high or low self-esteem may be disproportionately involved in traffic collisions and/or moving violations.

Operationally, people of low self-esteem, depression, or who have experienced many life events may become involved in collisions because of poor attention to the road. Occasionally, this type of person may become so depressed that he is suicidal, and such feelings may be expressed by his driving behaviour.

2.3. Studies of Driving While Impaired

The previous section described several psychosocial variables that have been found to be associated with traffic collisions and/or moving violations. The next section of the review explores another type of high risk driving: driving while impaired by alcohol. The purpose of this section is to assess whether the same psychosocial factors found to be associated with traffic collisions and/or moving violations are also associated with DWI. First, however, the review will address aspects of driving behaviours that may be related to DWI offences.

2.3.1 Evidence of Whether Different Driving Behaviours Account for Variations in DWI Arrests or Alcohol Related Collisions?

In this sub-section of the review, evidence is examined regarding possible relationships between different kinds of driving behaviours and DWI arrests. Four types of driving behaviours will be examined: dangerous styles of driving while sober, driving expressiveness, frequency of drinking and driving, and dangerous styles of drinking and driving. For the latter three variables virtually no research has been conducted, and therefore, indirect evidence is discussed.

Driving behaviour while impaired may be largely related to driving behaviour while sober. For example, if a person tends to take many risks when driving sober, he may tend to take risks when driving while inebriated. There is evidence that people who have been convicted of DWI have more moving violations and traffic collisions than people not convicted. Mercer (1985) examined driving records from a random sample of 9,273 British Columbia residents. Approximately 40 percent of the people with no DWI convictions had moving violation offences, whereas 78 percent and 80 percent of the people, with one and more than one DWI conviction respectively, had other moving violations. People with DWI convictions had more violations for speeding, failing to stop at a traffic light, and criminal negligence. The DWI group had over double the number of collisions compared to the group with no convictions. Maisto et al. (1979) found that DWI offenders were comparable to the general population in terms of speeding and careless driving violations. The DWI group did have more charges for reckless driving, driving while licence is revoked and traffic collisions. Perrine (1975) also found DWI offenders had worse driving records than drivers in the general population.

It should be noted that in the above studies, incidents where alcohol was a factor were not separated out of the analyses. Such incidents could be traffic collisions that involved alcohol, or charges for driving while disqualified, if the disqualification stemmed from a previous alcohol related charge. Also, gender, age, and amount of drinking, potential confounding variables, were not controlled in the analyses of the above studies. No study has been found that examines collisions and moving violations of alcoholics with and without DWI convictions.

Another driving related variable that may be associated with DWI arrests is driving expressiveness. Driving expressiveness is a term that refers to people who find driving an automobile very enjoyable. People who score low on this scale would simply view driving as a means of transportating oneself from one destination to another. No research exists on the relationship between driving expressiveness and DWI arrests. Chambliss (1967) has developed a model of deterrence which suggests that people are least deterrable from criminal acts that they find pleasurable. Therefore, people who find driving pleasurable in itself and who also drink considerable amounts of alcohol may be most likely to be arrested for DWI.

It is well accepted that people who drive while impaired by alcohol are significantly more likely to become involved in traffic collisions (see Mayhew, 1983 for a review). Although it has been assumed by numerous authorities that frequency of drinking and driving is associated with DWI arrests, this is a difficult variable to empirically examine. To properly explore this relationship, prospective studies are required. Retrospective studies are hampered by problems of recall and changes in frequency of drinking and driving behaviour that may occur subsequent to arrest. It is theoretically possible that people arrested for DWI drink and drive infrequently, but with dangerous styles of driving, while a large proportion of people may drink and drive frequently but are never apprehended.

There is considerable evidence that people convicted for DWI were brought to the attention of enforcement agencies by commission of a traffic collision and/or moving violation. Selzer et al. (1963) found that, in his study of DWI offenders in Ann Arbor, Michigan, all people (N=67) were stopped for unlawful driving patterns. For example, 10 people were stopped for speeding, 18 were driving in an erratic manner and 10 were involved in collisions. A study by Malfetti et al. (1973) of 1,842 people convicted for DWI reported that 27 percent were in collisions and that another

two thirds were identified by police because of a moving violation. Police records of 1,722 individuals convicted for DWI (Hyman, 1968) also showed that traffic collisions were the most common occurrence that drew the attention of the police to the offenders, and that moving violations, such as weaving, speeding, or failure to obey traffic signals, were frequently reasons why drivers were initially stopped. Filkens et al. (1970) showed that drivers in traffic fatalities who were impaired by alcohol were substantially more likely to be driving faster than drivers in fatalities who were not impaired.

Convicted DWI offenders may constitute an unrepresentative sample of all people who drink and drive, because they may drive in a manner that brings attention to themselves. Numerous people who drive while impaired are not apprehended. Estimates of the probability of being arrested for DWI range from 1 in 200 to 1 in 2,000 for each impaired driving event (Beitel, Sharp & Glauz, 1975; Brown, 1974; Borkenstein, 1972). A recent Canadian study arrived at a figure of 1 in 515 as the probability of being apprehended when driving with over 80 mg% alcohol (Lawsen, 1983). A major unanswered question is whether the group of people who drive under the influence of alcohol, without being apprehended, avoid detection through better driving.

Gusfield (1979) notes that few studies have specifically addressed an important issue:

> It is ironic that in all the vast research and writing on drinking driving, no study has attempted to find out how people do drive after drinking. (p. 165)

Neither laboratory nor epidemiological studies of incidence are capable of determining the complete range of factors associated with DWI. Epidemiological studies have been most useful in determining the relative risks and incidence of collisions that involved alcohol. Laboratory research has been useful in determining the relationship between drinking and psychomotor driving performance in a "controlled environment". Laboratory experiments have not provided any indication of factors relating to which people drink and drive, and, of the people who drink and drive, how they "normally" drive.

Studies in this sub-section have shown that people convicted for DWI were initially apprehended because of a moving violation and/or involvement in a traffic collision. Since DWI arrests are frequently directly associated with involvement in a traffic collision and/or a moving violation, it is possible that people arrested for DWI represent a skewed sample of all DWI offenders. The

difference between the groups may be that the arrested drivers are more reckless when driving while impaired than the non-convicted group. Also, the same psychosocial characteristics implicated in traffic collisions and/or moving violations may be implicated in DWI convictions. The extent to which alcohol alone, or alcohol in combination with different styles of drinking and driving, account for the variance in DWI arrests is largely unknown. The next sub-section examines studies on the psychosocial characteristics of people convicted for DWI.

2.3.2 Studies that Compare the Psychosocial Characteristics of DWI Offenders with the General Population.

There are several studies that have compared the psychosocial characteristics of people convicted for DWI to another group (usually the general population). These studies have been very useful in describing the social characteristics of DWI offenders. The typical DWI offender is male, between the ages of 20 and 54 with a median age of 37 years (Whitehead, 1975). More recent evidence indicates that younger people (i.e., between the ages of 20 and 35) are over-represented in terms of DWI arrests. For example, Mercer (1986) recently found that one half of drivers convicted for DWI were between the ages of 20 and 30, which is about twice as many as one would expect based on the

number of drivers in this age group. Similarly, Donelson (1985) showed that in roadside breath tests, young people are over-represented in terms of drinking and driving. Several studies have determined that, compared to the general population, a greater than expected proportion of DWI offenders are single, separated or divorced (Hyman, 1968; Waller, 1967; Yoder & Moore, 1973). In addition, DWI offenders are over-represented in terms of lower socio-economic status (Hyman, 1968; Chi et al., 1973, Clayton, 1980; Donovan et al., 1985).

Several relevant psychosocial variables have been found that significantly differentiate people convicted for DWI from drivers in the general population (Selzer & Barton, 1977; Selzer et al., 1977): low self-esteem, low self-control (i.e., impulsivity), low responsibility, high aggression, and high depression (see Table 2, Appendix B). The variables of low self-esteem and depression were implicated in DWI, but studies previously reviewed, did not identify these variables as being strongly associated with traffic collisions and/or moving violations.

Studies have also shown that people who drive while impaired are over-represented in terms of lack of moral attachment to the law (Norstrom, 1978), contact with social

welfare systems (Waller, 1967), negative attitudes toward legal authorities (Wilson & Jonah, 1985), and more contact with legal authorities (Zelhart et al., 1975). A recent study showed that 68 percent of a sample of people with multiple DWI arrests had a previous criminal record (Argeriou et al., 1985). Results from these studies indicate that variables of responsibility or disrespect for authority may be useful predictors of DWI.

A major difference between DWI convictions and traffic collisions or moving violations is that the former always involves ingestion of alcohol. Therefore, variables related to drinking may be associated with DWI arrests. Amount of drinking and frequency of drinking are two variables identified in the literature. Several studies have found that increased amount of drinking is related to DWI arrests (Norstrom, 1978; Wilson & Jonah, 1983; Selzer & Barton, 1977; Argeriou et al., 1986). Studies that explored the relationship of frequency of drinking and DWI have arrived at equivocal results. On one hand, studies have found that more frequent drinkers had a lower relative crash risk at any given BAC than less frequent drinkers (Brenner & Selzer, 1969; Hurst, 1974). On the other hand, DWI offenders were found to drink more frequently than drivers in the general population (Duncan & Vogel-Sprott, 1974;

Wilson & Jonah, 1983). Other studies have failed to find any relationship (Selzer & Barton, 1977).

One might expect that more intense reactions to drinking might distinguish people who are arrested from those not arrested for DWI. Selzer and Barton (1977) did find that convicted DWI offenders experienced more intense effects from drinking than a group of licensed drivers. For example, the DWI offenders became more depressed and more sociable after drinking than the licensed drivers. More intense reactions to drinking may help to increase the likelihood of being apprehended for DWI.

Very little research has been conducted that compares the characteristics of first and multiple offenders for DWI. One recent study in Massachusettes has shown first offenders are significantly different from multiple offenders for a variety of characteristics (Argeriou et al., 1986). Multiple offenders were significantly more likely to be single, be less educated, be lower in socio-economic status, be involved in other legal proceedings, drink more, and drink more most drinks. The two groups were similar in terms of age. No relevant research was found that compared people with zero and one DWI arrest. Typically, one time offenders were combined with multiple offenders into one group, and then compared to people with zero offences.

The list of psychosocial characteristics of DWI offenders is similar to the list of psychosocial characteristics of people who have poor driving records without alcohol involvement. Some authors have suggested that both these groups share the same constellation of traits that enhance driving risk, either with or without alcohol involvement (Clay, 1972; Zylman, 1976). This conclusion has been supported by some empirical studies (Perrine, 1970; Selhart, 1975; Donovan, 1985). In these studies the authors found that people with DWI convictions and people with poor driving records without DWI offences were similar in terms of their psychosocial characteristics. The main variables that differentiated the two groups were drinking related variables: the DWI offenders drank more heavily and frequently. Mercer (1985) concluded from his study that "the situation is one of the impaired problem driver as opposed to the impaired driver problem" (p.109).

The results of studies in this sub-section have shown that numerous psychosocial variables distinguish DWI drivers from drivers in the general population. A drawback of all these studies is that the DWI offenders were compared to drivers in the general population. Since a much larger than expected proportion of people convicted for DWI are known to be alcohol dependent, variables that distinguish the two

groups might be attributable to alcohol dependence rather than reflecting differences associated with drinking and driving. In fact, Nerviano and Cross (1983) reviewed 16 studies and found that alcoholics are more likely than non-alcoholics to possess most of the psychosocial variables that were also found to distinguish people who drive while impaired from drivers in the general population. Another potential confounder in these studies was gender. A confounder is a risk factor whose control will reduce the distortion in estimation of associations of interest (Kleinbaum et al., 1981). Psychosocial variables that emerge as significant in studies where both the DWI and comparison groups are matched in terms of alcoholism and gender provide stronger evidence than the aforementioned studies that these variables will be good predictors of DWI arrests in this population.

2.4 Studies of Driving Behaviours of Alcohol Dependent People

The review has covered the psychosocial characteristics of people involved in traffic collisions/moving violations, and DWI. In sub-section 2.4.1, studies of driving behaviours and especially DWI within the population of alcoholics were explored. The psychosocial characteristics of alcoholics who are high risk drivers were examined in the next sub-section.

2.4.1 Driving Risk of Alcohol Dependent People

Numerous studies have shown that, as average alcohol consumption per day of individuals increases, so does the likelihood of drunken driving, with the highest chronic consumers being at the greatest risk (Wilson & Jonah, 1985; Norstrom, 1978). Schmidt et al. (1962) demonstrated that "clinical" alcoholics have approximately nine times as many annual convictions for DWI as the general driving population. Selzer et al. (1963) and Selzer and Barton (1977) found the proportions of DWI offenders who were alcoholics, as determined by the Michigan Alcoholism Screening Test (MAST), were 57 percent and 68 percent respectively. The relationships found between alcoholism and DWI is so strong that one author recently reviewed the literature to assess whether alcoholics and DWI offenders were the same population (Vingilis, 1983). Although a high proportion of DWI offenders were found to be alcoholic, they were not all alcoholics. Similarly, Kornaczewski (1975) determined that alcoholics (i.e. people who voluntarily attended an alcoholism clinic) posed the greatest menace on the roads. Additionally, Yoder and Moore (1973) showed that in a sample of DWI offenders in San Diego, significantly more repeat offenders than first time offenders were alcoholics. No study has been found that refutes such findings; others support them (Smart, 1969; Fine, 1975; Rosenberg et al., 1972).

With reference not only to DWI but to traffic collisions, there is strong evidence that alcoholics may represent the single greatest public health menace on the roads. For example, Selzer (1969) found that individuals hospitalized for alcohol problems were seven times more likely to be in fatal collisions than members of the general driving population. Kornaczewski (1975) determined that alcoholics, as defined by The World Health Organization, had a relative risk of being in a traffic collision of 11.9 compared to 1.0, for a random sample of Australian drivers. Approximately two-thirds of Waller's (1968) sample of 261 alcoholics had been in collisions, as opposed to only 38 percent for a comparison group of non-alcoholics. Smart and Schmidt (1969) reported that alcoholics in collisions had both higher BAC levels and were more often responsible for their driving collisions in terms of driving errors than a control group of non-alcoholics in collisions.

Despite the strong association of alcoholism and high risk driving, there is also evidence that not all alcoholics who drive are equally susceptible to high risk driving. For instance, Zylman (1975) reviewed a number of studies and concluded that:

> There seems to have been such an obsession to link alcoholism to fatal crashes and drunken driving offences that the fact that many alcoholics do not come in contact with the police and are not involved in collisions has been overlooked. (p.180)

Support for this claim was drawn from studies of alcoholic populations. Filkens et al. (1970) determined that 83 percent of hospitalized alcoholics had good driving records, and Clay (1972) suggested that at most 34 percent of a sample of alcoholics drive while impaired. Donelson (1985) has stated that "A provocative unanswered question is why the vast majority of drivers impaired by alcohol do not have road accidents" (p.8).

This section showed that alcohol dependent people as a group have a greater probability of being high risk drivers than people in the general population; however, some alcoholics have good driving records. It is largely unknown how styles of drinking (i.e., quantity and frequency) may account for variations of DWI arrests within an alcoholic population. The final section of this review reports on studies of psychosocial factors associated with high risk driving, within an alcohol-dependent population. These psychosocial characteristics may help to distinguish which alcoholics are most likely to be arrested for DWI.

2.4.2 Psychosocial Characteristics of Alcoholics Who Display High Risk Driving.

Since no studies were found that examined the psychosocial characteristics of alcoholics who drive while impaired (see Table 3, Appendix B), studies of alcoholics who display other types of high risk driving are explored in this sub-section. Selzer (1961) speculated that alcoholics with poor driving records possessed several explanatory psychosocial characteristics. He hypothesized that people with psychological characteristics, such as hostility, egocentricity, depression and suicidal inclinations, have more deviant driving styles when intoxicated than equally intoxicated people without such characteristics. He conducted extensive interviews with three clinical alcoholics who displayed high risk driving. The interviews provided support for his hypothesis that "the alcoholic's drinking often releases behaviour motivated by underlying personality traits, which may then result in serious collisions or traffic violations" (p.302). The evidence, however, must be treated as highly tentative due to the small sample size.

Zelhart (1972) had 73 clinical alcoholics complete the 16 Personality Factor Questionnaire and classified subjects into three groups: group X, described as inhibited and frustrated, group Y, described as lacking the ability to

interact socially, and group Z, described as unsocialized and aggressive. Statistical analyses comparing frequency of traffic citations for the groups revealed that group X had the best driving records and group Z had the worst records ($p < .01$). A separate analysis of frequency of DWI arrests, however, showed no significant differences. Failure to find significant differences for DWI arrests might be attributable to the small sample size or to the fact that several personality traits were aggregated into larger groups.

Mozdzierz et al. (1975) classified clinical alcoholics, who were voluntarily admitted, into two groups: those with one or two collisions or violations and those with five or more collisions or violations. The subjects were administered the Guilford-Zimmerman Temperament Scales (GZTS) and the Minnesota Multiphasic Personality Inventory (MMPI). The GZTS showed significant differences on the scales of restraint-seriousness, ascendence-social boldness, and personal relations-cooperativeness; and the MMPI showed significant differences on depression and hypomania. The authors concluded that the high risk alcoholic drivers showed a greater tendency to manipulate and control others, and tendencies towards impulsivity, recklessness and irresponsibility.

Selzer and Vinokur (1974) examined the relationship between various psychosocial variables and traffic collisions in a sample of 285 alcohol dependent people. Several demographic and psychosocial variables were found to be significantly related ($p < .05$) to traffic collisions: aggression, total adjustment related to undesirable life events within the previous 12 months, physical stress responses, self reported stress, disturbances with parents and/or in-laws, years of education, frequency of drinking (negatively correlated), and age (negatively correlated).

Filkens et al., (1970) examined court and hospital records of a group of alcoholics in treatment. A significant correlation was found between rates of driving convictions and behavioural deviancy, as measured by criminal convictions, drunkenness convictions and mental illness. Also, high risk drivers were more likely to be single.

The studies reviewed in this sub-section are most closely related to the kind of study proposed in the present research. Therefore, it is useful to address their limitations. One limitation is the paucity of information on the specific driving behaviours of alcoholics. Only five

studies were found that examined the psychosocial characteristics of high risk drivers in an alcoholic population. Two of these studies were severely hampered by low sample sizes: three cases for the exploratory research by Selzer (1961) and 73 cases for the study by Zelhart (1972). In three studies having more reasonable sample sizes; however, moving violations and collisions were analysed rather than DWI arrests. None of the studies have explored the full list of variables that were identified in earlier sections of this review. No study has been located that attempts to assess whether different styles of drinking and driving account for variations in DWI arrests. This is true for both studies of DWI offenders compared to the general population as well as studies within alcoholic samples. Finally, no study has made separate comparisons among groups of people with zero, one and multiple DWI arrests. All of these limitations will be overcome in this research.

Some of the aforementioned limitations of research have been noted by other authors. Donelson (1985) has commented on the preoccupation with experimental studies that monitor driving performance for different doses of ingested alcohol in laboratory conditions. Many questions have remained unanswered. Donelson (1985) states:

> In general, the practical meaning of experiments remains in question. "Impairment" of certain skills may not equate with "unsafe" in the larger context.
>
> At the root of this issue is the fact that the actual driving task is poorly defined.... Few high-risk groups of drinking drivers have been studied. These and other factors have left large gaps in knowledge about alcohol-impaired driving and its relation to road accidents. (p.8)

Further Donelson points out that "the personal characteristics of drinking drivers remain unexamined" (p.11).

2.5 Conclusion

In the review of the literature, several psychosocial variables were implicated for individuals involved in traffic collisions and/or moving violations. Investigators also found that the same psychosocial variables, which were related to traffic collisions and moving violations, were associated with DWI arrests. However, the validity of these studies of DWI was limited because alcoholism or gender were not controlled, either in the designs or analyses. Alcoholics and males are over-represented, both in terms of high risk driving and the psychosocial variables of interest, as compared to the general population. Therefore, future studies of DWI that control for these variables may provide a valuable contribution to existing research.

The examination of drinking and driving in alcohol dependent samples has practically been ignored in the literature. This is an important group to research, not only for the reasons listed in the previous paragraph, but also because alcoholics as a group are at very high risk of DWI. Variables that distinguish the DWI and comparison groups, within this more homogeneous sample, have more etiological importance.

CHAPTER 3

Objectives

There is nearly unanimous agreement that alcoholics are significantly more likely to be arrested for DWI than people from the general population. The large proportion of alcoholics who are high risk drivers is often attributed to consumption of alcohol. The fact that not all alcoholics are high risk drivers suggests that there may be risk factors other than alcohol consumption by itself.

If all alcoholics are not equally dangerous, the task is then to identify what Zylman (1975) describes as the "killer drunks." What characteristics are associated with alcoholic drivers who have arrests for DWI? What, if any, socio-demographic variables are associated with DWI arrests in this sample? Is a distinguishing factor whether one group drinks more or more frequently than the other group? To what extent can the groups be distinguished based on styles of drinking and driving? Finally, what psychosocial characteristics are associated with DWI arrests? This study addresses these questions for a sample of alcoholics in treatment. The investigation of these issues will contribute to the development of a model to explain drinking and driving in an alcoholic sample.

In the review of the literature, several variables were identified as possible predictors of DWI arrests. However, no studies were found that specifically examined the relationship between these variables and DWI arrests within a sample of male alcoholics. It was thought possible that some of these variables might not be related to DWI arrests within a sample restricted to male alcoholics, because confounding due to gender and alcoholism would be eliminated. Since the evidence was not sufficiently strong to hypothesize which variables would be related to DWI arrests, it was decided to conduct an exploratory study to investigate these associations. The purpose of the study was to empirically examine relationships and to then build a model that explains DWI arrests.

The specific objectives addressed were as follows:

(1) What is the relationship between socio-demographic variables and DWI arrests?

(2) What is the relationship between variables related to drinking and DWI arrests?

(3) What is the relationship between variables related to driving and DWI arrests?

(4) What is the relationship between psychosocial characteristics and DWI arrests?

(5) What is the relationship between occurrences of traffic collisions and moving violations and DWI arrests?

(6) What model best describes the variance of DWI arrests?

(7) What psychosocial variables are associated with Frequency of Drinking and Driving, and Dangerous Styles of Drinking and Driving?

CHAPTER 4.0

Method

4.1 Design

The study was cross-sectional in design. The study had a retrospective component as people were classified into three groups based on their number of DWI arrests in the previous 10 years. While a longitudinal study might have offered some advantages in terms of separating causes from effects, this design permitted data collection within a reasonable time frame, and provides useful information about some of the questions that remain unanswered in the literature about drinking and driving.

4.2 The Sample

The subjects used in this study were alcohol-dependent people who were undergoing treatment for their drinking. Most alcoholics seeking treatment have indicated their desire to control their problems and, therefore, probably represent good candidates for research. Alcoholics in treatment are more likely to provide honest responses than alcoholics not seeking treatment because they have openly admitted they have problems with drinking. Furthermore, patients are encouraged in the treatment process to discuss

problems they encountered prior to admission. Hesselbrock et al. (1983) point out that "after consenting for hospitalization for alcoholism treatment, denial of drinking and minimization of recent symptoms is neither functional nor credible" (p.607). For these reasons it was expected that alcoholics in treatment, rather than simply alcoholics, were better candidates for research purposes.

The sample consisted of a group of male alcohol-dependent people. The study was limited to males for practical purposes because they: (a) represent the greatest proportion of admissions for alcoholism (about 80 percent), (b) they have a greater proportion of DWI convictions, and (c) they drive more than females, putting them at greater risk. The study was also restricted to people aged 19 to 65, who had driven an automobile at least 3,000 miles in the last three years, and had an Ontario driver's license sometime within the last three years. The mileage requirements were included to help ensure that all people were likely to have been in situations where they could have driven while impaired. The requirement of a Ontario driver's license was included so that driving histories could be validated (i.e., official driving records of Ontario were accessed). The sample excluded illiterates and people who were unable to comprehend the questions.

Although focusing on male alcoholics in treatment has disadvantages in terms of generalizability, there are advantages. It was desirable that the groups under study be drawn from the same population, in this case all people are alcoholics. Since the DWI and comparison groups were drawn from the same population, which is fairly homogeneous in some respects, the likelihood is increased that any differences found are a reflection of differences associated with DWI rather than being attributable to differences due to extraneous variables. Since it is not clear which variables may reflect differences that are not of primary interest it was desirable that all groups be drawn from similar populations (MacMahon & Pugh, 1970).

The sample was collected at the Donwood Institute and the Addiction Unit at St. Thomas Psychiatric Hospital. The Donwood Institute, located at 175 Brentcliffe Road in Toronto, Ontario, is a special public hospital for the treatment of people whose ability to function is impaired by alcohol and/or other drugs. The Donwood assesses individuals and determines the appropriate treatment program at the Donwood or elsewhere. Patients from two programs for the treatment of severe alcohol-dependence, the outpatient program and the inpatient program, were approached for data

collection. These programs for alcohol dependence are one month in duration (40 hours per week), with a two year follow-up period. The Addiction Unit at St. Thomas Psychiatric Hospital in St. Thomas, Ontario, also has a treatment program for alcohol-dependence and/or other drugs. The treatment program is also four weeks and is similar to the Donwood's program. The St. Thomas Addiction Unit, however, only accepts inpatients for treatment.

4.3 Sources of Data

Four primary sources of data were utilized for this study. The first source was a questionnaire designed specifically for this study (see Appendix E). This questionnaire is largely composed of items that were scored and combined together to form scales that measure psychosocial constructs. Also included are questions relating to driving and drinking behaviour, as well as some other questions of interest. The first part of this questionnaire contains 160 items that are answered either true or false. The second part contains questions and other scales that do not have true-false items. The names of each scale and its items, indicated by the block-letters, are included to help the reader identify of this study the composition of the scales. These names are not on the original forms. The total questionnaire was limited to under 250 items in order

to allow the subjects to complete the answers within one hour and to provide greater assurance that all the questions would be answered.

Two other sources of data were information collected routinely by the Donwood Institute (the Health Questionnaire) and face sheets used for admission purposes at St. Thomas. The Health questionnaire contains information on socio-demographic characteristics, alcohol use, health issues and legal problems. This information was collected by the Donwood's staff with a self-completed questionnaire. The questionnaire was originally designed for research purposes and to assist staff with determining different treatment requirements. The socio-demographic and alcohol use variables from this questionnaire were used primarily for descriptive purposes, and for comparing participants to non-participants.

Participants were also compared to the non-participants at St. Thomas for some socio-demographic characteristics. The comparative information was collected by St. Thomas staff on their admission form. The health questionnaire, however, was not used by the St. Thomas Addiction Unit. Therefore, it was necessary to add some selected questions from the health questionnaire to the main

questionnaire of this study for people at St. Thomas in order to make the background data from the two facilities comparable. The background questions that were used in common at the two facilities are listed in Appendix E (p.194 to p.196).

The final source of data utilized for this study was driving records from the Ministry of Transportation and Communications. These records contain dates for DWI arrests and convictions and traffic collisions since 1966 and moving violations in the past five years. Additionally, the information on traffic collisions contains judgements of responsibility and whether the driver had been drinking. Driver records were searched for DWI arrests within a 10 year period prior to admission.

Measurement Issues Associated with the Scales

The main questionnaire for this study is composed primarily of different scales that have already been developed (i.e. aggression, harm avoidance, responsibility, impulsivity, self-esteem, and depression). The major concerns in the selection of scales were their reliability and validity. Many scales were chosen from Jackson's (1974, 1976, 1984) instruments as he has paid particular attention to issues of validity and reliability in his procedure for

scale development. Each of Jackson's scales consists of 16 to 20 statements that represent specific traits. All the items are forced choice, either agree (true) or disagree (false). The scales by Jackson were constructed by first reviewing relevant psychologieal theories and then writing items on the basis of their conceptual links to the traits being measured (i.e. content validity). Construct validity was achieved by comparing the Personality Research Form (PRF) scales to numerous other psychological scales (Carmines & Zeller, 1979). Finally, several studies, which are reviewed in this section, established criterion validity through comparing ratings by judges of personality traits of individuals with scores these individuals achieved on the various scales. Another distinct advantage of some of Jackson's scales (i.e., from the Personality Research Form, 1967) is that they have been previously used on alcoholic populations (Hoffman, 1971; Hoffman & Nelson, 1971). Zuckerman (1978) reviewed a number of personality inventories in relation to thrill seeking behaviour and psychopathy and stated that: "Jackson's PRF represents the most advanced sophistication in test development with discriminant as well as convergent validity built into the test at the item level." The following includes a description of each scale chosen for this study and a rationale for its inclusion.

Aggression

Jackson's (1984) aggression scale is appropriate because the questions are aimed at various types of hostility that are hypothesized to be related to aggressive driving. Buss and Durkee (1957) identified eight components of hostility, of which, assault, indirect hostility, irritability and verbal hostility are most relevant for this study; these are the components that Jackson's scale describes. Jackson's scale has the added practical advantage over the Buss-Durkee inventory of being considerably shorter in length.

Split-half reliabilities were conducted on the scales of the PRF-E, and correlations for the scale of aggression were .74 for a psychiatric sample and .63 for a college sample (see Table 1, Appendix D). The scale of aggression was correlated with the scales from the Cattell high school personality questionnaire. Scales that would be expected to have high correlations (i.e. according to similar names or to theoretical relationships) were associated in the expected direction. For example, the scale of excitability showed the highest correlation with aggression (see Table 2, Appendix D). Aggression and excitability are two closely related terms, and therefore construct validity is supported.

Harm Avoidance

Jackson's (1984) harm avoidance scale was chosen because it measures both an enjoyment of exciting activities and an avoidance of personal physical danger. Jackson's risk taking scale (1976) was thought to be less appropriate because it examined a wider range of risk taking such as gambling for money, which was not considered important for this study. Zuckerman's (1971) thrill seeking scale was partially relevant, as eight items of this scale and the harm avoidance scale were nearly identical. The harm avoidance scale was ultimately chosen because it also emphasized a degree of attraction to dangerous situations, which was absent from other scales.

The split-half reliabilities for harm avoidance in a psychiatric and a college sample were .82 and .91 respectively. The scale correlated most highly with the scale of toughmindedness from the Cattell questionnaire (see Table 2, Appendix D).

Responsibility.

The most appropriate scale for responsibility was also chosen from one of Jackson's (1976) instruments. No other scale was found that specifically measures this construct.

Jackson (1976) summarized correlations between the scale of responsibility and several psychological tests, which were expected to bear theoretical associations. The correlations are listed on Table 3 (Appendix D) and, overall, support the construct validity of the scale.

Impulsivity

The impulsivity scale from Jackson's PRF-E (1984) was chosen as most appropriate for this study. The split-half reliabilities for impulsivity were .77 for a psychiatric sample and .85 for a college sample. The scale correlated most highly (-.38) with the self control scale from the Cattell questionnaire. Lack of self control is a term often used to describe impulsivity.

Self-esteem

A ten-item scale of self-esteem, developed by Rosenberg (1963), was also used. The scale has considerable face validity and has been shown to be meaningfully related to depression (Rosenberg, 1965). It has the advantage over Jackson's self-esteem scale because it has one half as many questions.

Depression

The depression scale selected was from Jackson's Basic Personality Inventory (1974). The reliability of this scale was very high (.87 based on a sample of 206 subjects) and the test construction strategy emphasized convergent and discriminant validity, substantive generalizability and response style suppression (Holden, 1978). The scale has a major advantage over most other depression scales because it purports to measure depression as a trait. Other scales such as the Zung (1965), Center for Epidemiologic Studies Depresssion Scale (Radloss, 1977) and Beck were rejected because they measure reactive moods or current levels of depression. The Dysfunctional Attitude Scale (Beck et al., 1979) measures a predisposition to depression, but was rejected primarily because it was thought too complicated and takes too long to complete.

Reactions to Drinking

A scale developed by Beckman (1980), designed to assess the importance of various effects of drinking, was utilized. The scale spans possible effects of drinking, which includes effects of drinking related to power and depression. Such reported effects of drinking may be related to DWI arrests, as these effects could influence driving behaviour.

Social Desirability and Infrequency

Two of Jackson's scales (1984), social desirability and infrequency, were included for the purpose of determining validity of the responses. The social desirability scale assesses the degree to which people describe themselves in terms judged as desirable. High scores may indicate a conscious distortion, a high self regard or a high degree of conventional socialization. The scale was used principally to assess the items on newly developed scales for this study. The other scale included for validity purposes is the infrequency scale. The infrequency scale consists of items that very few people experience (e.g., I have never talked to anyone by telephone). A high infrequency score indicates confusion, non-purposeful responding, carelessness, or gross deviation. Therefore, questionnaires with a high infrequency score were dropped from the final analysis.

New Scales Developed Specifically for this Study

In some instances new scales were created for this study. Items for all scales were written on the basis of content validity. In order to reduce the tendency of some people to respond in only one direction to items regardless of content, both positive and negative items were written.

If items from the developed scales had stronger correlations with the social desirability scale than its own scale, the items were dropped. This procedure helped ensure that items did not elicit information that is regarded as socially desirable. Internal consistency of newly created scales was determined by the use of Cronbach's alpha. These procedures are reported in the results, Section 5.3.2.

Disrespect for Authority

This scale was developed for this study because no other scale was found that measures these characteristics. The scale is composed of three items from the MMPI that Rommel (1959) determined distinguish collision repeaters from collision-free drivers. The remainder of the items were newly developed in order to measure deviance associated with criminality. Items were written to assess attitudes towards the law.

Major Life Events

The scale used to measure undesirable major life events was derived from the Canada Health Survey (Health and Welfare, 1978) and the Peri Events Scale (Dohrenwend et al., 1978). All items from the Canada Health Survey were included; however, since this scale did not cover a wide

range of events that could be encountered by alcoholics, new items were added. Items not covered by the Canada survey were taken from the Peri Events Scale in order to include a broader range of possible events. Also, this scale asked individuals to provide individualized ratings in order to assess the desirability of each event.

Dangerous Styles of Driving

Items on this scale requested information on driving behaviour in general. Most items were written in order to assess the degree to which respondents committed moving violations. High scorers reported that they frequently break traffic laws.

Driving Expressiveness

It was necessary to develop a driving expressiveness scale, which was intended to assess the degree to which individuals find driving pleasurable. No other scale was found that measures this variable. The questions were intended to determine the degree to which drivers view the automobile for either instrumental or expressive purposes. High scorers on this scale report that they enjoy driving in a variety of situations, whereas low scorers view driving more as simply a means of transportation.

Dangerous Styles of Drinking and Driving

A scale measuring the dangerous styles of drinking and driving was developed specifically for this study. Items on the scale were designed to determine how different individuals drive after they have been drinking (e.g., do they tend to drive aggressively or cautiously?) The scale contained sixteen items for which the subjects had three choices of response: most of the time, some of the time, and never or hardly ever (p.188). The coding for every other item is reversed to prevent acquiescence in responses. Items for this scale were either newly developed, or adapted from scales developed by Parry (1968) and Macmillan (1975).

Other Variables Included in the Study

Besides the scales already mentioned, other variables were used for this study. These variables, which can be found in Appendix E, were in the form of simple questions. The variables are: age (question 6, p.186), socio-economic status from the Blishen scale (question 3, p.194), marital status (question 1, p.194), education (question 3, p.194), number of standard drinks per drinking occasion (question 8a, p.187), the most number of drinks ever consumed in the past year (question 8e, p.187), and the average number of days per month driven after drinking at least 3 drinks in an hour, 4 drinks in two hours, 5 drinks in 3 hours, 6 drinks in 4 hours, etc. (question 9a, p.187).

4.4 Data Collection Procedure

Patients were first notified about the study by a staff at the Donwood Institute and a clerk at the St. Thomas Addiction Unit. The patients were provided with a copy of the letter of explanation and consent form (see Appendix C, p.161). People who answered yes to all the questions met the eligibility requirements of the study and were so informed. All people were asked to print their names on the forms and those who wished to participate signed the forms.

Appointments were made with consenting individuals to complete the questionnaire after program hours. Data were collected two to three weeks after initial admission. This time period after admission was considered appropriate because it allowed the patients ample time to adjust to their treatment (Hesselbrock et al., 1983). Sometimes patients undergo a denial phase when they are first admitted to treatment, and later become more accepting of their condition. The short time lag subsequent to admission was used to improve the likelihood of honest responses and to prevent possible interference with the treatment process. A study by Hoffmann (1971) showed that treatment process is unlikely to significantly alter many of the variables of interest (e.g., the PRF variables).

The data were collected by a self-administered questionnaire. This method was chosen because some of the questions are fairly sensitive; it was thought that bias might occur in an interview setting. One drawback of questionnaires was the possibility that some questions might not be answered. This obstacle was overcome to some extent by having a test administrator available to answer any questions and to encourage completeness of answers.

The questionnaires were administered in a group setting with typically two to seven patients in a session. Patients were first asked to complete a consent form for release of information from their driving records (see Appendix C; p.162). Then they were asked to complete the questionnaire, which took approximately 45 minutes.

4.5 Ethical Issues

Some of the questions, especially those about drinking and driving, which is a criminal offence, were socially sensitive. As well, some people may have felt some negative social stigma associated with receiving treatment for alcoholism. Therefore, it was desirable to assure the patients that such information would be treated as confidential.

In order to safeguard against possible release of such information, it would have been best to have the information collected anonymously. Unfortunately, total anonymity was impossible, since information from driver records and the health questionnaire were to be merged with the main questionnaire. In order to ensure confidentiality, a system was utilized in which names were not written on the questionnaires. A master list was compiled, and each patient was assigned a unique identification number which was then written on the questionnaire. The patients' names were written on envelopes and the corresponding numbered questionnaires were inserted inside. The envelopes, with the names, were discarded after the questionnaires were completed. When the driver records were received, the appropriate identification numbers were written on the records and the names were cut off. The master list with the names and identification numbers remained at the hospitals, but the researcher had access only to the identification numbers and data. These procedures were approved by the ethics committee of the University (see Ethical Consent, Appendix C, p163).

4.6 Sample Size

The sample size is a critical component of any study because it is related to the likelihood of achieving

statistical significance if a true difference exists -- the weaker the relationship, the larger the sample size required. In this study very weak relationships have little practical utility. For example, weak relationships can not easily be used for practical purposes of identifying high risk drivers or for tailoring treatment programs.

The initial sample size calculations were based on comparison of two groups, with the DWI convicted group containing 50 subjects and a total sample size of 200. A sample size of 200 was chosen because it was feasible to collect information from this many subjects. It was conservatively estimated from the literature that this total sample size would yield at least 50 subjects with a DWI arrest. The sample size calculations were based on an initial statistical procedure of two-tailed, independent samples student t-tests. The type I error was set at an alpha (α) of .05. The statistical power, or the probability of rejecting the null hypothesis if it is false, was set at a conventional .80 (80 percent).

Original estimates of standard deviations were obtained from a study that administered many of the same scales from this study on a sample of alcoholics (Hoffman & Nelson, 1971). These standard deviations were remarkably

close to the ones found in this study. The difference required between the two groups to be significant, according to the aforementioned criteria, was calculated according to the following formula.

$$\delta = \sqrt{\frac{(n_1 + n_2)}{n_1 n_2}} \quad [Z_\alpha + Z_\beta]\sigma$$

where δ = differences in scores required

n_1 = sample size of DWI convicted group

n_2 = sample size of non-convicted group

Z_α = critical value from the normal distribution for a type I error (1.96)

Z_β = critical value from the normal distribution for a type II error (.84)

σ = standard deviation

The actual differences were translated into relative differences (i.e., actual differences required divided by the total scores) to provide greater meaning because the scales were different in their length. The calculations indicated that a sample size of 200 subjects would enable detection of relative differences of between 7 and 12 percent in the two groups. Such differences were thought to be clinically be meaningful. When the data were collected it was discovered that substantially more people had DWI arrests than originally expected. This meant that statistical analyses could be made among three DWI groups without any substantial loss of statistical power.

Two hundred and fifty-eight people completed the questionnaire. This oversampling ensured that there would be about 200 subjects for multivariate analyses since cases would be discarded for any missing scales. Also, it was expected that some cases would be discarded from the study due to abnormally high scores on the infrequency scale.

4.7 Pilot Testing

Pilot testing was done in order to ensure that these questions were understood and that it was feasible to obtain the required information. Also, the entire instrument was tested to determine whether factors such as time constraints were important issues and to ensure that adequate and efficient procedures were adopted. The instrument was piloted on 20 alcoholics at the Donwood Institute, and no substantial problems were found in the data collection procedure.

CHAPTER 5.0

Results

5.1 Treatment of Raw Data

When the data were collected, they were coded and keypunched. An initial computer run (i.e. frequencies) was conducted to ensure all values for each variable were within the proper ranges. A reliability check, on a random sample of 10 percent of the questionnaires, showed the coding and keypunching error rate was very low (.15 percent) with non-systematic errors. Recoding of variables and data transformations was verified by proofreading and running frequencies to ensure the changes were correct. Data transformation and initial statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS: Nie, Hall, Jenkins, Steinbrenner & Bent, 1975).

In Part I of the main questionnaire (Appendix E), "X" marks that appear in either a true or false box for each question indicate the keying for each item of the true-false scales. If a subject checked the response that is marked, his score for that scale was incremented by one. Scales that measure the psychosocial characteristics of interest

were created by adding the keyed items for each scale together. In the remainder of the questionnaire, the names of the scales and the keying of items are indicated.

Procedures were implemented for dealing with missing data. When items in a scale were missing, the values were calculated by taking the subject's average of the remaining answered items for that scale. If more than 20 percent of the items in a scale were missing, the scale itself was treated as missing. This percentage is the cut-off point typically used by Jackson (Stockwell, 1985). Levy and Lemeshow (1980) suggest that such an imputation procedure, when variables are highly related, is usually the best method to deal with this type of missing value.

A different method was used for missing items of the Major Life Events scale because items for this scale were not expected to be highly related. For example, if a person was married in the last year it was unlikely that he also retired. One type of missing data that could occur for this scale was when a subject indicated that a life event did happen, but did not provide a desirability score. In these situations, the mean score for that item from all other subjects who experienced that event and provided a Desirability score was used. This procedure was necessary

for approximately two cases per item on the Life Events Scale. Additionally, for the Life Events Scale, some individuals checked off only events that did occur to them in the past year, but left all other events blank. In these instances, other events were coded as not occurring, instead of missing. The scale was treated as missing if all questions were left blank.

Three sources of information were utilized to determine the number of DWI arrests experienced by subjects within the past ten years. First, the subjects were asked to indicate the number of times they had been arrested for DWI in the past ten years (Part II, Question 16a). Also, on the questionnaire, subjects were asked to list all their convictions for criminal offences in the past five years (Part II, Question 5). Finally, information on DWI arrests in the past ten years was obtained from driver records of the Ontario Ministry of Transportation and Communications. The highest number of arrests from any of these three sources was the final figure used for number of DWI arrests in the past ten years. The number of self-reported DWI arrests was used if it was greater than the number from the traffic records because the traffic records do not necessarily contain all information on DWI arrests. More specifically, the traffic records may not contain

information on DWI arrests outside the province or DWI arrests that have not been to trial at the time of the request. Also, it is unlikely that subjects would report a socially undesirable event as occuring when it did not occur and it is unlikely that patients would report the occurrence of a non-existent event (MacMahon & Pugh, 1970). The variable of DWI arrests was treated as missing only if question 16a was left blank and no information could be obtained from the driver records.

5.2 Description of the Sample

5.2.1 Participation Rates

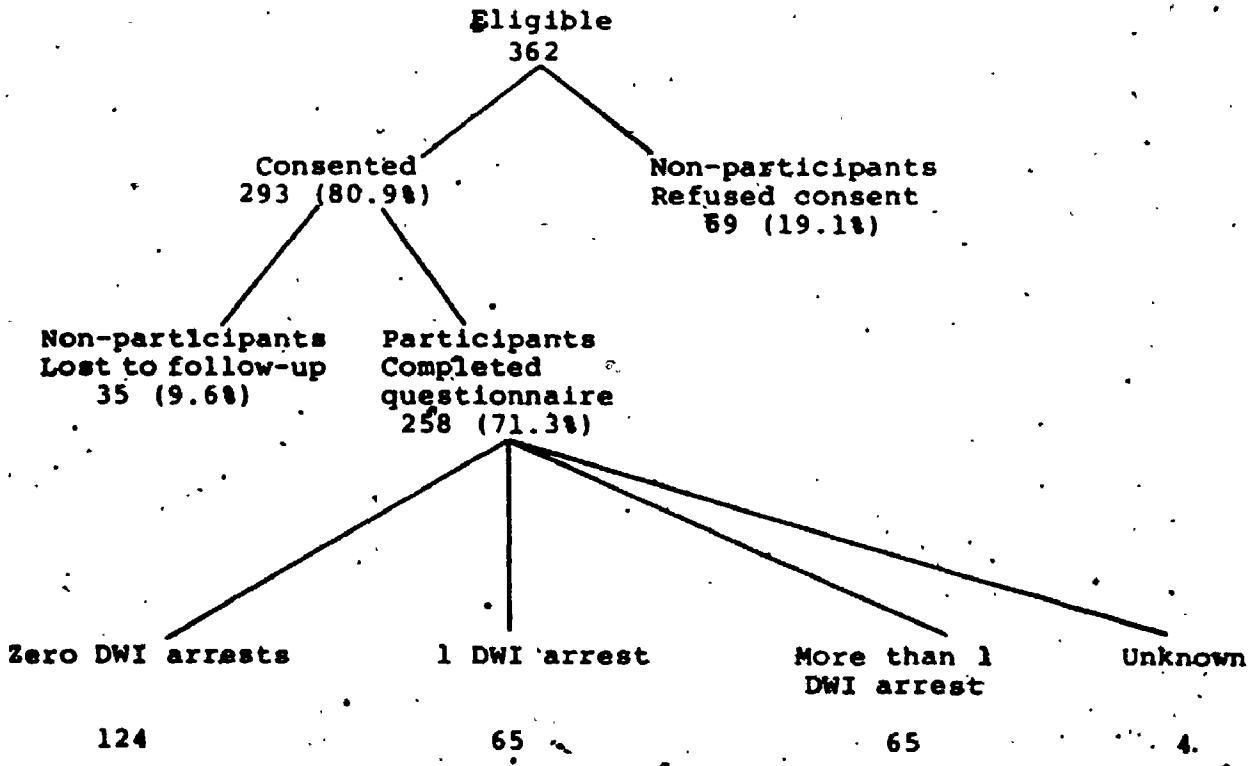
Three hundred and sixty-two (362) patients were identified as being eligible to participate in the study (see Table 5.1). For the participation rates, a total of 69 people (19.1%) declined to sign the consent form and did not participate in the study. Thirty-five other people (9.6%) consented to participate in the study, but never completed the questionnaire because they were discharged from treatment (N=11) or failed to show up for the scheduled times of the questionnaire administrations (N=24). Since the questionnaires were always administered after program hours, patients sometimes had other activities planned at the scheduled times. Seventy-one percent or 258 people completed the questionnaire.

Table 5.1

Population Hierarchy

Reference Population: Males receiving treatment for alcohol dependence

Sampled Population: Males, aged 19 - 65, at the Donwood and St. Thomas for alcohol dependence who have driven at least 3,000 miles in the past 3 years, and have had an Ontario Drivers Licence in the past 3 years



The final participation rates were higher at St. Thomas (80 participants of 91 eligible or 88%) than the Donwood (174 participants of 267 eligible or 65%). Outpatients, who were only at the Donwood, were often more reluctant to participate because they frequently wished to leave after program hours. Also there were tighter restrictions and fewer alternative activities at St. Thomas compared to the Donwood. For example, patients at St. Thomas are required to turn in their wallets and identification cards when they are admitted and to obtain absence passes when they left the premises, a procedure not required at the Donwood. This restriction meant patients at St. Thomas had fewer opportunities to leave the premises and in fact, few rarely did so, whereas inpatients at the Donwood frequently left the premises. Recreational activities both outside and on the treatment premises were much more accessible at the Donwood compared to St. Thomas. These are the primary explanations for the differential participation rates at the two treatment facilities.

5.2.2 Comparisons of Participants with Non-participants

In this section, comparisons are made between people who participated in this study (i.e., completed the questionnaire) and people who did not participate (i.e., refusals and people lost to follow-up). This information

was used to assess the representativeness of the participants with all people eligible to participate. The participants might represent a biased sample in terms of the outcome variable (i.e., DWI arrests) or other variables which could affect the interpretation of the results. Two separate sources of information, routinely collected at the Donwood and St. Thomas, were used in order to compare participants with non-participants.

The Donwood Institute

A self-administered health questionnaire was given to all 267 eligible patients at the Donwood Institute (see Appendix D). The questionnaire, which was administered and developed by Donwood staff, contains a wide range of items that can be classified into larger groups: (a) social, education and employment, (b) consumption of alcohol, (c) medical and psychological, and (d) legal. Comparisons between participants (n=174) and non-participants (n=93) for selected variables are provided on Tables 1 through Table 20 (Appendix F). Inconsistencies in the total numbers of participants and non-participants for each analysis are attributable to missing values. Table 5.2 provides a summary of the twenty comparisons. The comparisons were made with t-tests for interval variables and X^2's for

Table 5.2

Comparisons of Participants and Non-participants at the Donwood Institute

Categorical Variables	X^2	df	p
Marital status	.67	3	.879
Highest level of education	12.35	5	.030
Emotional or nervous upsets	12.98	4	.011
Frequency of depression	8.81	4	.066
Arrests or convictions for DWI	.07	1	.787
Arrests or convictions for car accidents	1.84	1	.175
Arrests or convictions for assault	.02	1	.878
Arrests or convictions for drunk behaviour	.46	1	.495
Number of times licence has been suspended	3.10	2	.212

Interval Variables	t	df	p
Socio-economic status	-1.25	242	.211
Number of years at current job	.62	259	.533
Average drinks consumed daily	.75	265	.452
Average days per month drinking	1.22	261	.233
Number of years alcohol causing a problem	- .26	260	.798
Number of visits to a physician	- .13	259	.900
Number of visits to a medical specialist	.08	255	.939
Number of visits to a therapist	1.23	259	.220
Number of visits to a social worker	2.10	231	.037
Number of visits to a psychiatrist	- .66	259	.512
Number of visits to a psychologist	.63	259	.528

categorical variables. The t values were calculated using pooled variances when the F statistic was not significant and separate variances when the F statistic was significant (i.e., $p<.01$). Corrected χ^2s were used for 2 by 2 tables. These situations required special treatment of the data so that assumptions of the statistical tests were not violated.

The sample sizes for the participants and non-participants at the Donwood are sufficiently large to avoid type II errors. Power analysis for the interval variables showed that the sample size is large enough to detect relative differences of approximately 10 percent between the participants and non-participants for most variables (the criteria for assessing significant differences between groups is outlined in section 4.6). Therefore, differences between groups that are not significant provide supportive evidence that the sample is not biased due to lost cases for these variables.

As can be seen from these tables, the participants and non-participants were statistically similar for practically all the comparisons. For the variables of marital status, occupational category, and number of years at their current job, the groups were similar. One statistically significant difference ($p<.05$) was highest

level of education achieved. The participants were generally better educated than the non-participants. It appears that the two groups are not different in terms of the severity of alcohol problems, as none of the three probability values for these problems were statistically significant. For the medical and psychological variables, two of the eight analyses were statistically significant: trips to a social worker and frequency of emotional or nervous upsets. The participants were significantly more likely to visit a social worker and to report more emotional upsets in the past year. The two groups were similar in terms of visits to a family physician, medical specialists, therapist, psychiatrist, and psychologist, and in terms of self-reported depression. The health questionnaire included several questions on legal involvement in the past year: arrests or convictions for drinking and driving, car accidents, assault, other crimes of violence, and robbery during the one year period previous to admission at the Donwood. Additionally, there is information on the number of times each patient had lost his drivers licence. None of the chi squares for any of these legal variables were statistically significant. On the whole, the Donwood participants appeared to be very similar to the non-participants.

St. Thomas

Eleven of 95 eligible people from St. Thomas did not consent to participate or were lost to follow-up. Since the numbers at St. Thomas are small, only very large differences between groups are detectable in the analyses. Only four types of characteristics were available from the face sheets to compare participants with the non-participants (this was the only information that could be accessed on all eligible patients). Demographic information on marital status, religion, age, and occupation was obtained from the admission face sheets for all people eligible to participate in the study. Tables 21 through Table 24 in Appendix F provide details of the results for comparisons on these variables, and Table 5.3 provides a summary. None of the differences between groups are statistically significant and examination of the means and percentages shows that the groups are nearly identical.

5.2.3 Comparisons of Donwood and St. Thomas Participants

Comparisons were made between people completing the questionnaires from St. Thomas (n=84) and the Donwood (n=174). As can be seen from Table 5.4 (Tables 25 to 30 in Appendix F provide more detailed information), the patients are similar for most variables. The two groups are similar in terms of marital status, age, average number of standard

Table 5.3

Comparisons of Participants and Non-participants at St. Thomas

Categorical Variables	X^2	df	p
Marital status	.20	1	.653
Religion	0	1	1.0

Interval Variables	t	df	p
Age	.70	89	.485
Socio-economic status	-.29	93	.772

Table 5.4

Comparisons of Participants at St. Thomas and Donwood

Categorical Variables	X^2	df	p
Marital status	.71	3	.869
Highest level of education	18.94	5	.002

Interval Variables	t	df	p
Age	.51	254	.608
Average number of drinks per day	-.12	247	.903
Socio-economic status	6.40	237	.001
Number of years at current job	.96	243	.336

drinks per day, and number of years at their current job. The two groups are significantly different in terms of their socio-economic index and in terms of educational levels. People at the Donwood had both higher Blishen scores on the socio-economic index and had more education. It is not surprising that these variables are significantly different since the Donwood has higher quality facilities (e.g., private carpeted rooms) than the psychiatric hospital. Historically, the Donwood has received people of higher socio-economic class than similar facilities in Ontario, as it was evolved from a private hospital where patients were required to pay fees.

Although the Donwood and St. Thomas have different clientele in terms of socio-economic status and education, participants from these two hospitals are combined for all subsequent analyses. Combination of the groups is appropriate for the aim of this study, which is to investigate the association of psychosocial variables and DWI arrests (the purpose is not to estimate population parameters). The two hospitals combined provide a wider range of people in terms of socio-economic status and education than either hospital alone.

5.2.4 Description of the Participants

The participants ranged in age from 19 to 66 with a mean age of 41.7 and a standard deviation of 11.3 years (see Table 5.5 for a breakdown by 5 year age groups). The distribution of patients by marital status (Table 5.6) indicated that only 42 percent were currently married and a large proportion (30%) were widowed, divorced, or separated. Tables 5.7 and 5.8 provide a breakdown of the participants in terms of their socio-economic categories (Blishen & McRoberts, 1976) and highest level of education achieved.

In terms of consumption of alcohol, the participants were very heavy drinkers. On average, they reported drinking 13.7 standard drinks per drinking occasion, and the average drinking occasion lasted 8.6 hours. Only five percent of the sample reported drinking less than five drinks per occasion (see Table 5.9).

Respondents reported that they drove an average of 17,800 kilometers in the past year. The separate drinking histories and driving histories indicated that the sample is likely a high risk group for driving while impaired by alcohol. Approximately three-quarters of the participants

Table 5.5

Distribution of the Sample by Age

Age Categories	Number of People	Percentage
25 and under	19	7.4
26 - 30	29	11.2
31 - 35	32	12.4
36 - 40	44	17.0
41 - 45	42	16.3
46 - 50	26	10.1
51 - 55	28	10.8
56 - 60	21	8.1
61 - 65	15	5.8
Unknown	2	.8
TOTAL	258	99.9

Table 5.6

Distribution of the Sample by Marital Status

Marital Status	Number of People	Percentage
Never Married	46	17.8
Married	101	39.1
Remarried	9	3.5
Common-law	20	7.8
Widowed	6	2.3
Separated	45	17.4
Divorced	28	10.9
Unknown	3	1.2
TOTAL	258	100.0

Table 5.7

Distribution of the Sample by Usual Occupation
According to Six Blishen (Blishen and McRoberts, 1976)
Socio-economic Categories

Socio-economic Status	Number of People	Percentage
Class I (29 or lower)	42	16.3
Class II (30 to 39)	69	26.7
Class III (40 to 49)	52	20.1
Class IV (50 to 59)	23	8.9
Class V (60 to 69)	38	14.7
Class VI (70 to 79)	15	5.8
Unknown, students, and homemakers	19	7.4
TOTAL	258	99.9

Table 5.8

Distribution of the Sample by Highest Level of Education

Highest Level of Education Completed	Number of People	Percentage
Elementary school or lower	14	5.4
Some high school	69	26.7
High school completed	49	19.0
Technical education	16	6.2
Apprenticeship	16	6.2
Community college	29	11.2
Some university	21	8.1
University completed	17	6.6
Graduate or professional degree	24	9.3
Unknown	3	1.2
TOTAL	258	99.9

Table 5.9

Distribution of the Sample by
Average Number of Drinks Consumed per Drinking Occasion
in the Past Year

Number of Drinks	Number of People	Percentage
Less than 5	14	5.4
5 to 9	60	23.3
10 to 14	77	29.8
15 to 19	56	21.7
20 to 24	19	7.4
25 to 29	12	4.6
Over 30	8	3.1
Unknown	12	4.5
TOTAL	258	99.9

Table 5.10

Distribution of the Sample by
Average Frequency of Drinking and Driving[1] per Month During the
One Year Period Previous to Admission to the Hospital

Number of Days	Number of People	Percentage
0	60	23.3
1 to 5	76	29.5
6 to 10	35	13.6
11 to 15	18	7.0
16 to 20	38	14.7
21 to 25	9	3.5
26 and over	12	4.6
Unknown	10	3.9
TOTAL	258	100.0

[1]Drinking and driving is defined as driving after drinking at

reported that they drove after drinking at least three standard drinks in an hour (or four drinks in two hours or five drinks in three hours, etc.) at least once per month on average in the past year (see Table 5.10). Consumption of these amounts of alcohol in the specified times will normally produce a BAC level of 80 mg% (i.e., legal impairment) in a 175 lb. person. Thirty percent of the participants reported drinking this amount and later driving more than ten times per month in the previous year on average. Twenty-three percent reported they did not drink and drive at least once per month in the past year; however, over one half of these people (31 people) already had been arrested for DWI within the previous 10 years.

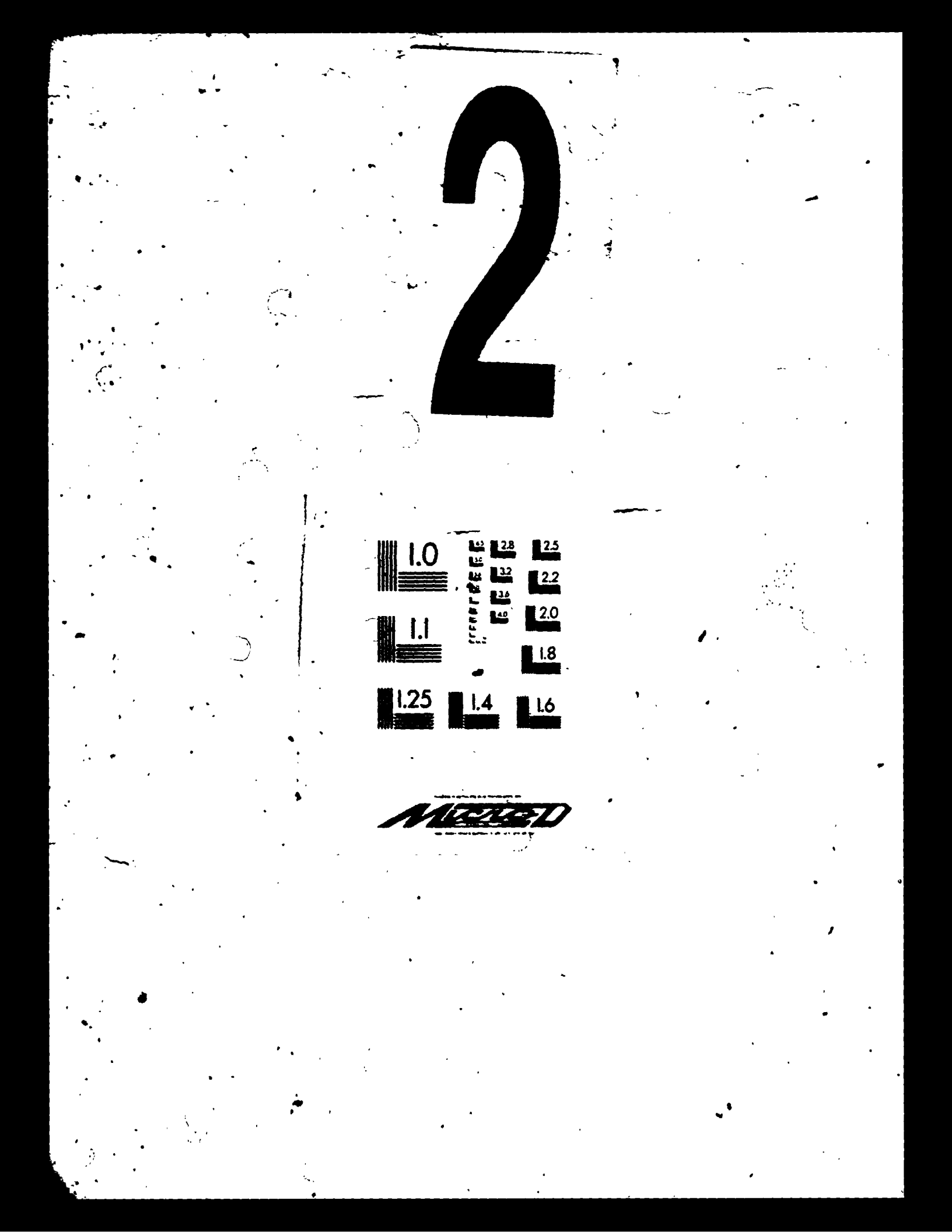
Participants were asked if they were ever stopped by police while they were driving while impaired by alcohol, but were not asked to take a breathalyzer. This happened to forty-three percent of people who answered this question. People were asked to provide reasons why they weren't asked to take the breathalyzer. There was a wide range of descriptive answers, which were categorized into three groups according to whether it seemed likely that the police were aware that the individual was impaired: (1) police knew the driver was impaired; (2) police did not know the driver was impaired; (3) insufficient information to

classify. Twenty-seven people were in category 1 (28 percent), 51 people were in category 2 (52 percent), and 19 people were in category 3 (20 percent).

5.3 Issues of Validity and Scale Development

5.3.1 Validity of the Responses and Selection of Cases for the Analyses

An indication of validity of self-reported information was achieved by comparing the number of DWI arrests reported by the subjects with the number of DWI arrests on their driver records. There are two types of inconsistencies that could occur between self-reported DWI and DWI arrests on the driver records: self-reported over-reporting and under-reporting of DWI arrests in comparison with arrests from the driver records. As previously mentioned, there are reasons to expect some over-reporting compared to the driver records, and there is little reason to expect that these cases are inaccurate. However, self-reported under-reporting of DWI arrests does represent error by those subjects. The frequencies of self-reported and DWI arrests from driver records were compared for the three categories of zero, one and more than one DWI arrest. For cases where both the driving record and self-reported information on DWI arrests were available (i.e., 90.7 percent of the cases), 83.5 percent of the cases had perfect agreement, self-reported under-reporting occurred for 6.4 percent and over-


2
1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY

reporting for 10.1 percent. When discrepancies between self-reported and driver records occurred, the highest number of arrests from either of these sources was used as the final figure for DWI arrest (see Section 5.1, p.63).

There are different explanations for under-reporting of DWI arrests. People could have simply made a mistake for this question. Some people may have reported zero arrests if an arrest occurred in 1975 or 1976, due to forgetfulness or because they thought it occurred before 1975, the time criterion used in this study. Also, some people who had several driving violations may have been confused because of a poor driving record.

Another possible explanation is that people deliberately lied in order to present themselves in a socially desirable manner. This interpretation implies that they could also have lied about other questions on the questionnaire. This last interpretation seems least likely considering all participants were volunteers and had full knowledge that their driving records would be obtained. This final interpretation, however, is potentially damaging to the aims of this study.

It was decided to individually examine each case where under-reporting occurred to assess whether there was reasonable evidence that individuals were being truthful. People who reported elsewhere on the questionnaire that they had a DWI arrest (N=3) were kept in the analysis. People who reported one arrest when their records showed two or more arrests were also kept because it seemed likely they simply forgot an arrest. Three people whose arrests occurred in 1975 or 1976, but reported no arrests, were also included in the analysis. Finally, one person was included because he had so many moving violations and collisions (i.e. five) that it was felt he may have been confused about the actual number. Only three people did not meet these criteria for inclusion and were subsequently dropped from the study.

Driver records could not be accessed for twenty-four individuals. Seventeen of these people refused to sign the consent form to release the information. The Ministry of Transportation and Communications was unable to locate the records of the other seven who did sign the consent form. Since validation with driver records was not possible for this group, other methods were utilized. First, it was decided to accept self-reported information if people reported two or more DWI arrests (N=5). It seemed unlikely

people would report two or more arrests, which are socially undesirable events, if they did not occur. Second, for people at the Donwood, other data were used to validate responses. The Donwood independently collected self-reported information (see Section 4.3) on number of DWI arrests and convictions in the past year and the number of times their drivers' licences were lost due to police action. If any of the self-reported numbers from the Donwood and the questionnaire for this study showed inconsistencies, the subjects were dropped from future analyses (N=4). Three of these people under-reported on the main questionnaire and one person over-reported. Finally, subjects were dropped from future analyses if they provided no information for their number of DWI arrests (N=3) or the number of DWI arrests could not be validated (N=3).

Another type of information used to assess the validity of the responses was the infrequency scale from Jackson's Personality Research Form. The scale of infrequency was included to ensure that the patients were answering the questions purposefully, carefully, and could understand the questions. It is suggested by Jackson (1967) that scores of four or more on the infrequency scale likely indicate errors in responding. Seven people fell into this category and therefore were not included in any of the

following analyses. This procedure yielded 120 people with zero DWI arrests, 56 with one DWI arrest and 62 with multiple DWI arrests.

5.3.2 Newly Created Scales

Procedures, developed by Jackson (1974), were used to evaluate the validity of newly created scales and their items. Items for all the newly created scales were originally written on the basis of content validity. For example, all questions for the scale of Dangerous Styles of Drinking and Driving relate to driving behaviours that increase one's chances of being apprehended for DWI. The Pearson 'r' program was used to correlate each item with its own scale and each item with the Social Desirability Scale (see Table 4, Appendix D for these correlations). Items that have stronger correlations with their own scales than with the Social Desirability Scale indicate that the items measure what they should measure (i.e., discriminant validity) and that they are independent of Social Desirability. Analysis revealed that only one item ("I used my horn a lot" from the Dangerous Styles of Drinking and Driving Scale) from the four scales had a stronger correlation with the Social Desirability Scale and it was dropped from future analyses. The correlation of this item with the Social Desirability Scale was -.19, and was .16 with its own scale.

Additionally, scales should possess reliability or internal consistency. Table 5.11 lists Cronbach's alphas for the four new scales. Three of the four scales have high alphas (i.e., over .65), which indicate acceptable levels of internal consistency. The scale of Disrespect for Authority has a lower alpha (.51), which indicates that it may be measuring more than one construct.

5.4 Comparisons of People With Zero, One and Two or More DWI Arrests.

A sizeable proportion of people had been arrested for DWI more than once (i.e., 26 percent, n=62). This group was not broken down further for more detailed comparisons because the sample sizes were too small for reliable analyses. Since 56 people had been arrested once and 120 people had not been arrested, the groups were sufficiently large to conduct analyses among the three groups. Analyses utilizing three groups are desirable because more can be learned about the relationships of the predictor variables and DWI arrests. For example, are people with one DWI arrest more similar to people with zero arrests or to people with more than one arrest? Also, relationships that approximate a linear trend across the three groups provide a simple interpretation of the data. The first analyses compared all three groups simultaneously; then post hoc comparisons were made between the three separate pairs of groups.

Table 5.11

Cronbach's Alphas for Newly Developed Scales

Scales	Crombachs Alpha
Dangerous Styles of Drinking and Driving	.76
Disrespect for Authority	.51
Driving Expressiveness	.73
Dangerous Driving	.69

The first set of analyses were conducted to assess bivariate relationships between each variable and DWI arrests. One way analysis of variance was conducted for each variable with interval data (i.e., every variable except Marital Status). The groups were classified according to their number of DWI arrests in the past 10 years; zero arrests (Group 0), one arrest (Group 1) or more than one arrest (Group 2).

The probability value corresponding to the between groups F ratio was first examined. Second, the probability associated with a linear trend across the three groups was examined. This value indicates whether scores on a variable either increase or decrease in a linear fashion across the three groups (i.e., does a straight line with an upward or downward slope adequately reflect the variation among the data points?). Finally, two-tailed post hoc comparisons for all combinations of the three groups were used (i.e., Group 0 compared to Group 1, Group 0 compared to Group 2, and Group 1 compared to Group 2). In order to reduce the possibility of type I errors, Scheffe's test was used for these comparisons. Scheffe's test is appropriate in situations where the groups contain unequal sample sizes, as in this study. It is the most conservative test of commonly used tests for assessing differences between pairs of means (Keppel, 1973).

One assumption of analysis of variance is that the variances among the different groups are approximately equal. Bartlett's test was used to determine whether this assumption was violated (Keppel, 1973). This test is most appropriate when the groups have unequal sample sizes, as in the present study. This assumption was not met for three variables: Most Number of Drinks in a Day (question 8e), Number of Drinks per Drinking Occasion (question 8a), and the scale of Dangerous Styles of Drinking and Driving. A log transformation was used on variables where Bartlett's test indicated that the assumption was violated (i.e., $p < .01$: Keppel, 1973). All transformed scores then met the assumption of homogeneity of variance.

Five major categories of variables, which correspond to the first five objectives of this study, were examined in relation to DWI arrests. Tables 1 through 4 (Appendix G) provide the mean scores for each variable among the three DWI arrested groups. The tables also present the group sizes and standard deviations. Table 5.12 presents the probability values associated with: the between groups F ratios, the F ratios for linear terms, and Scheffe's test for comparisons among the three groups.

Table 5.12 Probability values associated with the between group F ratios, linear trend F ratios and significance (p<.05) of tests between DWI arrested groups using Scheffe's test.

VARIABLE NAME	PROBABILITY VALUE FOR BETWEEN GROUP F RATIO	PROBABILITY VALUE FOR LINEAR TREND	COMPARISONS BETWEEN GROUPS: GROUP 0 (ZERO DUI ARRESTS) AND GROUP 1 (ONE DUI ARREST)	GROUP 1 (ONE DUI ARREST) AND GROUP 2 (TWO OR MORE DUI ARRESTS)	GROUP 0 (ZERO DUI ARRESTS) AND GROUP 2 (TWO OR MORE DUI ARRESTS)
DEMOGRAPHIC VARIABLES					
Age	.0014	.0004		*	*
Socioeconomic status	.0018	.0006			
Education	.0882	.0328			
DRINKING RELATED VARIABLES					
Most number of drinks in a day (transformed)	.0002	.0001		*	*
Number of drinks per occasion (transformed)	.1036	.0580			
Frequency of drinking	.0429	.0129			*
Reaction to drinking scale	.0315	.4027		*	
DRIVING RELATED VARIABLES					
Average number of days drinking and driving per month	.7794	.4939			
Dangerous styles of drinking and driving scale (transformed)	.0001	.0001		*	*
Driving expressiveness scale	.0081	.0029			*
Dangerous styles of driving scale	.0703	.7158			
PSYCHOSOCIAL VARIABLES					
Responsibility scale	.0158	.8514		*	
Disrespect for authority scale	.0025	.0006			*
Harm avoidance scale	.2337	.0959			
Impulsiveness scale	.1472	.1125			
Depression scale	.2071	.0765			
Self-esteem scale	.7339	.4983			
Aggressiveness scale	.6554	.4456			
Major life event scale	.0268	.0080			*
Social desirability scale	.0110	.0542		*	

*Groups are significantly different (p< .05) using Scheffe's correction formula for multiple comparisons.

5.4.1 (Objective 1) What is the Relationship Between Socio-demographic Variables and DWI Arrests?

Two of the three demographic variables (Age and SES) had significant probabilities associated with both the between groups F ratio and the linear trend. The significance of the linear trend indicates that increased number of DWI arrests was associated with decreasing age and SES. The means for these two variables revealed that as number of arrests increased, age and SES decreased (Group 2 was significantly different from Group 0 and Group 1 for age, and Group 2 was significantly different from Group 0 for SES). For education, the probability associated with the between group F ratio was not significant; however, the linear trend was significant. This means that no two pairs of groups were significantly different, but that increased number of DWI arrests was related to decreasing education.

Marital status was categorical, and therefore ANOVA was an inappropriate statistical test. A X^2 test was used to examine the relationship between marital status and DWI arrests. People who were currently married or living common-law were compared in terms of their arrests to people who were currently single in terms of their arrests. The probability value associated with the X^2 was not significant ($p=.24$).

5.4.2 (Objective 2) What is the Relationship Between Variables Related to Drinking and DWI Arrests?

Four analyses were conducted for variables related to drinking: Most Drinks in a Day, Number of Drinks per Drinking Occasion, Frequency of Drinking (i.e., average number of days drinking per week), and Reactions to Drinking. Three of these variables, Most Drinks in a Day, Frequency of Drinking , and Reactions to Drinking had significant between groups F ratios, and two variables had significant linear ratios (i.e., Most Drinks in a Day and Frequency of Drinking). Increases in DWI arrests occurred with increases in Most Drinks in a Day and with decreases in Frequency of Drinking. The linear trend for Number of Drinks per Occasion was close to significant ($p=.058$). For the variable of Reactions to Drinking, people with one arrest reported they experienced less intense reactions to drinking than people with more than one arrest ($p<.05$).

5.4.3 (Objective 3) What is the Relationship Between Variables Related to Driving and DWI Arrests?

Four variables were included to assess the relationships of different driving behaviours with DWI arrests (see Table 5.12). Frequency of Drinking and Driving in the previous year was not associated with DWI arrests during the previous 10 year period. Since fifty-three people who were

arrested for DWI reported that they either reduced or stopped drinking and driving after their arrest, it is possible that the lack of an association may be a reflection of changed driving behaviours after arrest.

Being arrested for DWI may largely be a function of how one drives while impaired. It was discovered that Dangerous Styles of Drinking and Driving and Driving Expressiveness were linearly associated with DWI arrests. The significance of the linear terms for these driving related variables is largely attributed to people in Group 2 scoring significantly higher than people in Group 0 or Group 1. Neither the between groups probability value nor the linear term for Dangerous Styles of Driving were significant.

5.4.4 (Objective 4) What is the Relationship Between Psychosocial Characteristics and DWI Arrests?

Four between groups probability values for the F ratios were significant for the psychosocial variables. For two variables (i.e., Disrespect for Authority and Major Life Events) the linear terms were also significant. The probability values of the nine psychosocial variables are listed on Table 5.12. Comparisons between groups with Scheffe's test showed that people with two or more arrests had higher scores on Disrespect for Authority than people

with one or zero arrests and people with two or more arrests had higher undesirable Life Events scores than people with zero arrests. For two other variables, Responsibility and Social Desirability, only the between groups F ratio was significant. For Responsibility, people with one arrest scored higher than people with zero arrests or multiple arrests. For Social Desirability, people with two or more arrests scored higher than people with one arrest. None of the remaining psychosocial variables (Harm Avoidance, Impulsiveness, Depression, Self-esteem, and Aggressiveness) were significantly related to DWI arrests.

Confirmation of the Bivariate Results

Comparisons between pairs of groups for each variable (Table 5.12) revealed that people with zero or one arrest tended to be similar, while people with multiple DWI arrests appeared much different from each of the other two groups. For example, Scheffe's test indicated that 14 of 40 comparisons between either Group 0 or Group 1, and Croup 2 were significant, but only one of 20 comparisons between Group 0 and Group 1 was significant. These differences between pairs of groups cannot be attributed to differences of statistical power, since the sample sizes were about the same. Inspection of the means on Tables 1 to 4 (Appendix C) revealed that in most instances Group 0 and Group 1 were

similar, whereas Group 2 was different. It was decided to conduct analyses to confirm this initial interpretation.

A contrast was used from the one-way ANOVA procedure with SPSS. The contrast tested whether the averages of scores from Group 0 and Group 1 were significantly different from Group 2. SPSS does not employ a correction factor for post hoc contrasts. Since the contrast procedure was post hoc, it was decided to use the more conservative Scheffe's test to assess significance (Kirk, 1984). As well, the uncorrected probability values are reported, because they are useful to indicate the approximate magnitude of the relationships.

As expected, the significance levels of variables for the linear trend (Table 5.12) were similar to the significance levels for the contrasts (Table 5.13). For each variable where the linear trend was significant, the same variable was also significant for the contrast. One other variable, Social Desirability, was significant for the contrast, but not significant for the linear trend. People with multiple DWI arrests described themselves as less socially desirable than people with less than two arrests. Chi square analysis was conducted for marital status since this variable was categorical. Single people were

Table 5.13

Contrasts between the Combined Groups (0 and 1) and Group 2

Variables	t value	d.f	p
Demographic Variables			
Age	1.64	235	.001*
Socio-economic status	2.24	218	.010*
Education	2.13	234	.034*
Drinking Related Variables			
Most number of drinks in a day (transformed)	-4.19	227	.0001*
Number of drinks on a typical drinking occasion (transformed)	-2.68	226	.008*
Frequency of drinking	1.99	228	.047*
Reaction to drinking scale	1.99	233	.048
Driving Related Variables			
Average number of days drinking and driving per month	-.68	228	.500
Dangerous styles of drinking and driving (transformed)	-3.88	228	.0001*
Driving Expressiveness	-3.04	234	.003*
Dangerous styles of driving	-1.47	234	.141
Psychosocial Variables			
Responsibility	1.63	235	.104
Disrespect for authority	-3.18	235	.002*
Harm avoidance	1.62	231	.106
Impulsiveness	-1.96	234	.051
Depression	-1.50	216	.135
Self-esteem	.38	235	.703
Aggressiveness	-.918	228	.359
Major life events	-2.53	214	.012*
Social Desirability	2.85	235	.005*

*Significant at $p < .05$ using Scheffe's test statistic for post hoc contrasts. The formula is given by $F = \frac{[\,1(\bar{x}_2) - \frac{1}{2}(\bar{x}_0) - \frac{1}{2}(\bar{x}_1)\,]^2}{MS_{WG}\,[\frac{1}{N_2} + \frac{1}{4xN_0} + \frac{1}{4xN_1}]}$ (Kirk, 1984).

significantly more likely to have multiple DWI arrests ($p=.04$). The results confirm that collapsing Group 0 and Group 1 into one group is warranted for the development of a model. Also, a more parsimonious analysis of the data is possible if these groups are combined.

5.4.5 (Objective 5) What is the relationship between occurrences of traffic collisions and/or moving violations, and DWI arrests?

The purpose of these analyses is to determine whether alcoholics arrested for DWI tend to be poor drivers when sober. A one-way analysis of variance was used to assess whether statistically significant relationships exist between DWI arrests and occurrences of driving incidents. The number of driving occurrences were compared for the same three DWI arrest groups described previously. Separate analyses were carried out for driving incidents of all traffic violations, all collisions, and speeding violations. Analyses were then conducted for collisions that did not involve alcohol and moving violations (moving violations exclude offences such as driving while licence is suspended that may have been associated with a previous DWI charge - See Appendix A for definitions). These latter analyses are a clearer test of whether the DWI arrested groups are also poor drivers while sober, since incidents related to alcohol are not included.

Table 5.14 summarizes the results, and Table 5 (Appendix G) provides further information on means, standard deviations, and group sizes. The only variable significantly associated with DWI arrests was Total Number of Collisions. It is not surprising this variable was significant, since nearly 21 percent of the people arrested for DWI were apprehended as a result of a collision. The F ratios were not significant for collisions without alcohol involvement. The latter results are consistent with the conclusion that alcoholics arrested for DWI generally are not worse drivers while sober than alcoholics not arrested for DWI. The results are also consistent with a previous finding in this study that DWI arrests were not related to the Dangerous Styles of Driving Scale (see Table 5.12, p.). This observation also suggested that people arrested for DWI were not worse drivers in general.

5.5 (Objective 6) What Model Best Describes the Variance of DWI Arrests?

Bivariate relationships between each predictor variable and DWI arrests were examined in the previous sections. A more thorough understanding of the data can be gained if multivariate analyses are used to explore the relationships among the predictor variables and to isolate

Table 5.14 Probability values associated with the between group F ratios, linear trend F ratios and significance ($p<.05$) of tests between DWI arrested groups using Scheffe's test.

VARIABLE NAME	PROBABILITY VALUE FOR BETWEEN GROUP F RATIO	PROBABILITY VALUE FOR LINEAR TREND	COMPARISONS BETWEEN GROUPS		
			GROUP 0 (ZERO DWI ARRESTS) AND GROUP 1 (ONE DWI ARREST)	GROUP 1 (ONE DWI ARREST) AND GROUP 2 (TWO OR MORE DWI ARRESTS)	GROUP 0 (ZERO DWI ARRESTS) AND GROUP 2 (TWO OR MORE DWI ARRESTS)
All traffic violations	.2753	.1154			
All collisions	.0057	.0033			
Speeding violations	.9374	.7399			
All moving violations	.8088	.5723			
Collisions without alcohol involvement	.7373	.6903			

*Groups are significantly different ($p<.05$) using Scheffe's correction formula for multiple comparisons.

each variable's independent contribution towards the variance of DWI arrests. In this section, a model will be developed in order to assess which combination of variables best explains DWI arrests.

In section 5.4.5, a contrast procedure showed that Group 0 and Group 1 were alike for most independent variables, yet both groups were dissimilar from Group 2 for many variables. Therefore, Group 0 and Group 1 were combined to form one group of people for the multivariate analyses.

The bivariate analyses presented in Table 5.13 showed that people with less than two DWI arrests were not significantly different from people with multiple DWI arrests for some variables. If the bivariate analyses showed that the independent variables were not important, then these variables would also be unimportant for the multivariate analyses. Therefore, it was decided not to include variables in the multivariate model if they were previously shown to be unimportant. Variables with probability values of .10 or greater (see Table 5.13) were not considered for the multivariate model. Six variables were in this category and therefore dropped from the model: Average Number of Days Drinking and Driving per Month,

Dangerous Styles of Driving, Responsibility, Harm Avoidance, Depression and Aggressiveness.

Three models are presented in this section. For the first model, all main effects (i.e., no interaction terms) are considered. This full model presents all coefficients to standard errors for each independent variable. This model is useful for assessing each variable's unique contribution towards explaining DWI arrests. The second model utilizes a stepwise procedure which is useful for assessing which subset of variables best accounts for DWI arrests. Then, an examination is made of whether interaction terms that included socio-demographic variables are significant when controlling for main effects. An assessment is made as to whether the socio-demographic variables distort the relationships between each independent variable and DWI arrests. This is accomplished by examining interaction terms with stratification and mathematical modeling (Kleinbaum et al., 1982). The final model includes the interaction terms selected by this procedure.

Logistic regression was the primary statistical procedure used for the development of the models (Kleinbaum et al., 1982). Logistic regression is a multivariate

analytic tool that is suitable in instances where the outcome variable is dichotomous and the predictor variables are continuous or categorical. In this study most predictor variables were interval, but not necessarily normally distributed, and one predictor variable (i.e., Marital Status) was dichotomous. Logistic regression was preferred because the assumptions are less rigid than other statistical procedures, such as discriminant analysis. Although discriminant analysis is more efficient, it is less valid, given the nature of the data (Efron, 1975). Logistic regression analyses were conducted using BMDP statistical software (Dixon, Brown, Engelman, Frane, Hifl, Jennrich, & Toporek, 1985).

A total of 176 cases were included in the final model. Cases were dropped for the multivariate analysis if information was missing for any of the variables. It is unlikely that the exclusion of these cases created bias in the results, since the means for the predicted variables are not substantially different between the entire sample and the cases used to develop the model (see Table 7, Appendix G).

5.5.1 The Full Model of Main Effects.

Table 5.15 presents the ratios of the coefficients to the standard errors for the full model with the main

Table 5.15 Ratios of coefficients to standard errors for the main independent variables

MAIN PREDICTOR VARIABLES	COEFFICIENT/ STANDARD ERROR
Marital status	-1.65
Age	-1.36
Socio-economic status	.78
Education	-1.43
Most drinks in a day	2.65
Number of drinks per occasion	- .64
Frequency of drinking	-1.97
Reactions to drinking scale	- .34
Dangerous styles of drinking and driving	1.81
Driving expressiveness	.26
Disrespect for authority	- .11
Impulsiveness	- .74
Major life events	1.16
Social desirability	.49

variables. Coefficients to standard errors that exceed ±1.96 are significant ($p<.05$). Positive coefficients indicate positive associations with multiple DWI arrests, while negative associations indicate the opposite. For example, increases in the Most Number of Drinks Consumed in a Day and decreases in Age were associated with multiple DWI arrests, after relationships of all other variables were considered. As can be seen on Table 5.15, higher Most Number of Drinks Consumed in a Day and lower Frequency of Drinking were significantly associated with DWI arrests. Being single, lower Age, lower Education, or higher scores on Dangerous Styles of Drinking and Driving tended to be related to multiple DWI arrests, but these variables failed to reach statistical significance.

A Pearson correlation matrix was generated between each pair of independent variables. (See Appendix G, Table 8). The "R" coefficients listed on Table 8, which could theoretically range from -1 to +1, measure the strength of a linear relationship between two variables. Coefficients that approach -1 or +1 indicate strong relationships, whereas correlations close to 0 indicate no linear association. The square of a coefficient is the amount of variation the two variables have in common. For the sample size from this study, a coefficient of .14 is significant at

.05, and .22 is significant at .001 for a two-tailed test. Correlations of about .3 or higher are considered to be sufficiently large to be useful in understanding the data.

This matrix was useful for assessing why some variables became unimportant in the multivariate analyses. For example, Driving Expressiveness and Undesirable Life Events were each significantly correlated with Age (the r values were -.40 and -.42 respectively). Education was an excellent measure of socio-economic status (r=.56). High correlations indicate that the variables in question are related, and in some instances, either variable may have been a useful predictor.

5.5.2 The Main Effects Model with Stepwise Logistic Regression

Stepwise logistic regression was used to assess which combination of variables best predicts multiple DWI arrests. Stepwise regression first selects the variable that accounts for the greatest variation in multiple DWI arrests. Variables were included in the model when they demonstrated that their inclusion significantly improved the goodness-of-fit of the model based on the constant model and previously selected variables. Inclusion terminated when none of the remaining variables had probabilities of less than .10 corresponding to the appropriate F value. If two or more

predictor variables were highly correlated and each variable alone significantly improved the model, it was likely that only one variable was selected for the final model.

Table 5.16 presents the variables selected by stepwise logistic regression that were chosen for inclusion in the model, as well as their approximate F values, coefficients, the ratio of the coefficient to the standard error, and the probability values. The first variable to enter was Most Number of Drinks Ever Consumed in a Day. Although one might expect Frequency of Drinking to be the next variable selected because it had the second highest standardized coefficient (see Table 5.15), age entered. Once Most Drinks Ever Consumed in a Day was selected, Frequency of Drinking became less important than Age. Dangerous Styles of Drinking and Driving was the final variable to enter the model.

The utility of the model was assessed by comparing the accuracy of predictions (based on the logistic regression) in relation to the observed outcomes. Comparisons between observed and predicted DWI arrests are presented on Table 5.17. A probability value of 0.5 from the logistic regression equation was used to determine whether predicted cases were classified as either multiple DWI arrests or less

Table 5.16 Variables entered in the stepwise logistic regression analysis.

VARIABLES	x^2	COEFFICIENTS	RATIO OF COEFFICIENT TO THE STANDARD ERROR	P VALUES
Most number of drinks in a day	16.06	.039	2.28	.0001
Age	8.86	.043	-2.58	.003
Dangerous styles of drinking and driving scale	3.54	-.072	-1.81	.06

Table 5.17 Comparison of observed DWI arrests to predicted DWI arrests from the stepwise regression when .5 or over was used to classify people as 0 or 1 DWI arrest.

		PREDICTED		
		0 OR 1 DWI ARREST	2 OR MORE DWI ARRESTS	
OBSERVED	0 or 1 DWI arrest	119	7	126
	2 or more DWI arrests	36	14	50
		155	21	176

Accuracy = 75.6%

Sensitivity = $\frac{14}{50}$ = 28.0%

Specificity = $\frac{119}{126}$ = 94.4%

than two arrests, since there were no a priori probabilities for the response categories. One hundred and thirty-three of 176 cases were correctly classified, which resulted in an accuracy rate of 75.6 percent. If all people were classified as one or less DWI arrests without using the logistic model, 71.6 percent of the predictions would have been correct. Most misclassifications were due to false-negatives; 36 people with more than one arrest were predicted to have zero or one arrest. Only 7 people were false positives. These people were predicted to have more than one arrest but actually had zero or one arrest. The model could predict an even larger percentage of people as multiple DWI offenders, if a higher probability value, which corresponds more closely to the actual distribution of cases in the sample, was used to classify people. For example, if a figure of .7 or over was used to classify people as zero or one arrest, the relationship between observed and predicted outcomes can be seen on Table 5.18. This resulted in more false positives but fewer false negatives.

Table 5.18 Comparison of Observed DWI Arrests to Predicted DWI Arrests from the Stepwise Regression when .7 or Over was Used to Classify People as 0 or 1 DWI Arrests.

OBSERVED	PREDICTED: 0 OR 1 DWI ARREST	PREDICTED: 2 OR MORE DWI ARRESTS	
0 or 1 DWI arrest	91	35	126
2 or more DWI arrests	20	30	50
	111	65	176

Accuracy = 68.7%

Sensitivity = $\frac{30}{50}$ = 60.8%

Specificity = $\frac{91}{126}$ = 72.2%

5.5.3 Assessment of the Interaction Terms that Included Socio-demographic Variables.

In this sub-section, the socio-demographic variables are assessed as potential effect modifiers. In this study, four variables were analysed to assess their effect modification: Age, SES, Education, and Marital Status. Results from this study and other studies have shown that these variables were associated with DWI arrests. It seemed likely that these extraneous variables might modify the relationships between the predictor variables and DWI arrests.

Effect modification occurs when estimates of an association of interest are non-uniform over the strata of an extraneous variable (Kleinbaum et al., 1982). It is measured as an interaction between an extraneous variable and a predictor variable. In order to reduce the number of interactions entered into the final model, unimportant interactions were eliminated. The elimination of these interaction terms was accomplished by two methods: stratification and mathematical modeling (Kleinbaum et al., 1982).

Stratification was accomplished by first categorizing all variables into two groups (the median was used to ensure approximately equal numbers in each cell). Cross-tabulations were calculated for each predictor variable and each socio-demographic variable. This yielded numerous pairs of 2 X 2 tables. Odds ratios were then calculated for each 2 X 2 table for the two strata of the socio-demographic variables. The odds ratios were compared between the two strata (see Table 6, Appendix G). If the odds ratios for the two strata were approximately equal, then the variable in question was not considered further in terms of an interaction. However, if the variable had considerably different odds ratios in the two strata (e.g., one odds ratio was approximately twice the size of the other odds ratio or differed by a relative risk of one) then the variable was kept to be further analysed as an interaction term. For example, the odds ratio for people of low SES was .48 for frequency of drinking and DWI arrests, and was .53 for people with higher SES. Since these odds ratios were similar, the interaction term of SES and frequency of drinking was not considered further. Twenty-one interactions were selected for further examination using stratified analysis.

Each interaction term selected by the procedure mentioned above was entered individually into a logistic regression analysis. The importance of each interaction term was assessed by a forced entry model. Logistic regression was first performed with all main effects in and the interaction term out. Then the chi-square statistic was used to assess the improvement in goodness-of-fit when the interaction term was added to the model (Kleinbaum et al., 1982).

This procedure revealed that four interaction terms were significant ($p<.05$): Education and Amount of Drinking per Occasion; Education and Most Number of Drinks; Education and Frequency of Drinking, and Age and Frequency of Drinking. The interactions, indicated on Table 6, Appendix G, can be interpreted in the following manner. The interaction between Education and Amount of Drinking per Occasion suggests that Amount of Drinking per Occasion is associated with DWI arrests for lower educated people but not for higher educated people. The odds ratio for lower educated people was 5.80 and the odds ratio for higher educated people was .78. Similarly, higher education moderated the relationships of both Most Drinks in a Day and Frequency of Drinking with DWI arrests. Finally, less Frequency of Drinking was more strongly associated with DWI arrests for older people as compared to younger people.

The full model, with important interactions included, is presented on Table 5.19. Although each interaction alone was significant when added to the main effects model, when all four interactions were simultaneously added to the model, none were significant. The inclusion of the interaction terms did not appreciably alter the standardized coefficients of the main effects that were not included in an interaction. Some main effects of terms that were composites of the interaction terms did change appreciably. For example, age and frequency of drinking became unimportant when the interaction terms were added and Education reversed its direction and became significant. However, one can not conclude that there is a significant main effect for education as the main effect may have been an artifact of including the important interactions (Dawes, 1969).

5.5.4 Assessment of the Interaction Term Most Drinks and Frequency of Drinking.

It was decided to test another interaction, given the results from the bivariate analyses. An interesting finding was that increased Most Drinks in a Day and decreased Frequency of Drinking were both significantly associated with DWI arrests. It was speculated that higher numbers of

Table 5.19 Ratios of coefficients to standard errors for the main independent variables

MAIN PREDICTOR VARIABLES	COEFFICIENT/ STANDARD ERROR
Marital status	- 1.57
Age	.08
Socio-economic status	.04
Education	1.99
Most drinks in a day	2.39
Number of drinks on a typical drinking occasion (AMOUNT)	.32
Frequency of drinking	.78
Reactions to drinking scale	-.55
Dangerous styles of drinking and driving	1.86
Driving expressiveness	.40
Disrespect for authority	-.21
Impulsiveness	-.93
Major life events	1.13
Social desirability	.62
Education * Most drinks in a day	-.65
Education * Amount	- 1.27
Education * Frequency of drinking	- 1.39
Age * Frequency of drinking	-.61

Most Drinks may be more associated with DWI arrests for less frequent than more frequent drinkers. Drinkers who drink more, but less frequently are typically classified as binge drinkers. Therefore, it seemed possible that the interaction of Most Drinks and Frequency of Drinking may explain more variation in DWI arrests than either variable alone.

The interaction of Most Drinks and Frequency of Drinking was tested. The chi square statistic was used to assess the importance of the interaction term when it was added to the full (main effects) model. The interaction did not significantly improve the main effects model ($p=.61$).

Each variable by itself appeared related to DWI arrests. Alcoholics who drink less frequently probably have a lower tolerance to alcohol and may become more physically impaired than other alcoholics, given equivalent amounts of alcohol consumed. If they drive in this condition, they may have more difficulty driving carefully, and therefore may be more likely to be arrested for DWI. Similarly, higher numbers of Most Drinks by itself might also lead to more dangerous driving while impaired.

5.6 (Objective 7) What Psychosocial Variables are Associated with Frequency of Drinking and Driving and Dangerous Styles of Drinking and Driving?

In the review of the literature, it was suggested that certain psychosocial variables could be related to increased Frequency of Drinking and Driving, and Dangerous Styles of Drinking and Driving which in turn might be associated with an increased probability of being arrested for DWI. It was decided to pursue Objective 7 only if these driving related variables were significantly associated with DWI arrests. Such analyses would improve our understanding of DWI arrests only if the driving related variables were shown to be good predictors.

Results presented in Table 5.12 showed that Frequency of Drinking and Driving was not related to DWI arrests. Since Frequency of Drinking and Driving was not a useful predictive variable, it was not worthwhile to conduct the analyses for this objective. It is worthwhile, however, to explore possible reasons why Frequency of Drinking and Driving were not related to DWI arrests.

There was strong evidence that the relationship between Frequency of Drinking and Driving and DWI arrests was weaker than expected because some people who were arrested for DWI experienced specific deterrence. In other

words, people who receive punishment for a crime are less likely to again commit the crime (Andenaes, 1966). In this instance, the crime is DWI. The relationship between Frequency of Drinking and Driving and DWI arrests may have been non-significant because people were asked to report their frequency of drinking and driving in the past year, rather than before a DWI arrest. Some people may have been arrested for DWI several years previous to their admission for treatment. They may have reduced their frequency of drinking and driving because of their arrest. Therefore, estimates of Frequency of Drinking and Driving after arrest may have been lower than estimates before arrest. Although estimates before a DWI arrest would have been more useful as a predictive variable, these were not used because such estimates might not have been accurate due to poor memory recall.

The questionnaire included questions to assess whether changes in drinking and driving behaviours occurred subsequent to a DWI arrest. One would expect, according to deterrence theory, that people arrested for DWI would subsequently reduce their frequency of drinking and driving. Twenty-one people reported that they never drove while impaired by alcohol after their DWI arrest. The DWI arrested group, as a whole, also reported they drank and drove an average of 10.5 days per month before their arrest,

compared to 8.9 days per month in the past year. A proportion of people did not appear to have been deterred by their arrests for DWI: 15 people reported they did not drink and drive less frequently after their arrests.

Dangerous Styles of Drinking and Driving was significantly associated with DWI arrests. This occurred despite the fact that 32 people reported they drank and drove more carefully after their arrest. It seemed worthwhile to examine relationships between Dangerous Styles of Drinking and Driving and other variables, since this variable was a good predictor of DWI arrests.

The correlation matrix presented in Table 8 (Appendix G) is useful for assessing the relationship between Dangerous Styles of Drinking and Driving and the other predictor variables. Disrespect for Authority was most strongly related to Dangerous Styles of Drinking and Driving (R=.40). Increased Disrespect for Authority was associated with higher scores on Dangerous Styles of Drinking and Driving, and 16 percent of the variances of these two variables are shared. This finding indicates that Unsocialized Characteristics may have been partially explained by Dangerous Styles of Drinking and Driving in the logistic regression analysis.

The variables of Harm Avoidance and Age showed strong negative relationships with Dangerous Styles of Drinking and Driving as values of R were -.32 and -.30, respectively. It was not surprising that people who reported they avoided potentially harmful situations also scored low on the Dangerous Styles of Drinking and Driving Scale. As well, it seemed reasonable to expect that younger people would drink and drive more dangerously than older people. Younger drivers have been frequently observed to have worse driving records in general. Several other correlations were also statistically significant, but the variance these variables shared in common was less than 9 percent. Therefore, they are less useful towards understanding the relationships.

CHAPTER 6.0

Discussion

6.1 Introduction

In the results section, relationships between the predictor variables and DWI arrests were explored. This chapter provides a discussion of these findings in the context of existing literature on the subject. Suggestions are provided as to why results from this study may have differed from other reports in the literature. Then, a discussion of the limitations of this study and the generalizability of the results will follow. Practical and theoretical implications of the results will be discussed in the following section. Finally, directions for future research will be recommended.

6.2 Discussion of the Major Findings in the Context of the Literature.

Few other studies of DWI are directly comparable to this study. The reasons for this lack of comparability stem primarily from two sources. The first difference is that other studies have not distinguished people with zero, one, or multiple DWI arrests or convictions. Typically, other studies have combined single and multiple offenders into one

group, and then compared this group to people with zero arrests. This procedure was not employed for this study because it was empirically shown to be inappropriate.

The second reason other studies are not comparable is because they used different samples and comparison groups. No study was found that explored similar predictors of DWI within a sample of alcoholics. Alcoholic DWI offenders may be different from DWI offenders in the general population. Similarly, the comparison groups of other studies were often drivers from the general population. Since people in these comparison groups typically drank less alcohol and contained more females than the DWI groups, relationships found in other studies may have been related to differences in drinking or gender rather than differences in drinking and driving.

In the following sub-sections, results of this study are compared to other studies. Keeping in mind the above mentioned differences in studies, some insights can be gained. In particular, it would not be unexpected that fewer variables are implicated in DWI from this study than from other studies. The reason that some variables may be unimportant in this study is because sex was held constant (i.e., only males were included) and all people were heavy

drinkers. It has been previously discussed how these two variables may be important confounders. This section is organized in the following manner. In sub-section 6.2.1, bivariate relationships of analyses between people with zero and one DWI arrest are examined. The next sub-section (6.2.2) compares simple relationships of people with repeat DWI arrests to non-repeaters. Then the relationships between occurrences of driving incidents (i.e., moving violations and collisions) and DWI arrest are explored. Finally, sub-section 6.2.3 describes the multivariate analyses and suggestions are made with respect to interpretation of these analyses.

6.2.1 Comparison of People with Zero and One DWI Arrest.

An important finding of this study was that people with zero DWI arrests were nearly indistinguishable from people with one DWI arrest in terms of demographic characteristics, drinking characteristics, driving characteristics and psychosocial characteristics. No other relevant studies were found where people with zero and one DWI arrest or conviction were compared. Several studies compared people with zero DWI to people with one or more DWI, but were not similar enough to provide useful data for comparative purposes. Significant differences found between the two groups in other studies may have been more attributable to the recidivists than the one time offenders.

The finding that Croup 0 and Group 1 were similar might be explained if the two groups were also similar in terms of their drinking and driving behaviours. In this instance DWI arrests would not be a very precise measure of drinking and driving behaviour. People arrested once might simply have been the "unlucky" ones to have been caught.

Evidence from this study provided some support for the proposition that the drinking and driving behaviours of Group 0 and Group 1 were not substantially different. There are essentially two kinds of drinking and driving behaviours that are related to an individual's probability of being apprehended for DWI: Frequency of Drinking and Driving, and Dangerous Styles of Drinking and Driving. Results showed that a very large proportion of people with zero arrests drove while impaired at least once per month in the previous year (78.1 percent). Both Group 0 and Croup 1 reported they drove while impaired an average of about 8 days per month. Furthermore, the two Groups were not significantly different in terms of Dangerous Styles of Drinking and Driving. Since the actual driving behaviours that lead to DWI arrests were similar for the two groups, the failure to find significant differences for other psychosocial characteristics may be a reflection of no real differences in drinking and driving

behaviours. In this case, being arrested once would not be a precise indicator of actual drinking and driving behaviour.

6.2.2 Comparison of People with Less than Two DWI Arrests and Multiple DWI Arrests.

Since people with zero and one DWI arrest were similar in the present study, they were combined into one group and then compared to multiple offenders. Bivariate analyses showed that people with multiple arrests (Croup 2) were significantly different from people with less than two arrests for twelve of the twenty-one variables examined (see Table 5.13, p.??): all the socio-demographic variables, three variables related to drinking, two of the four variables related to driving, and three of the nine psychosocial variables. The kind of differences found and their relationship to other studies are described in the following material.

There are some possible explanations for the many differences between multiple offenders and others. Recidivists may have fundamental differences from others in terms of their actual drinking and driving behaviour, which may increase their likelihood of being arrested for DWI more than once. They may have drunk and driven more frequently or more dangerously than others. In fact, Group 2 was found

to drink and drive significantly more dangerously than either Group 0 or Group 1 (see Table 5.12, p.95); however, no significant differences were found between groups for Frequency of Drinking and Driving. Differences found between recidivists and others may have been a reflection of basic differences in styles of drinking and driving. In this instance multiple arrests is a useful measure of actual DWI behaviour. Alternatively, differences found between recidivists and the other groups might be a reflection of one time offenders being deterred whereas others were not. Although very few people were deterred from drinking and driving by the threat of punishment (i.e., general deterrence), others arrested once for DWI, may have been deterred by actually receiving punishment (i.e., specific deterrence). Recidivists, as opposed to one time offenders, possibly did not experience any substantial deterrent effect from their first arrest.

Theories exist to explain why some people recidivate and others do not. Two common theories suggest that recidivism is an outgrowth of a disruptive personality or due to social isolation from significant others (MacLeod, 1965). Many studies of criminal populations have shown recidivists to be different from one time offenders. For example, juvenile recidivists, convicted for any type of

crime, have been shown to have markedly different MMPI profiles than non-recidivists (Megarie & Bohn, 1979). With respect to DWI convictions, a study showed repeaters were significantly different from one time offenders for a variety of variables used in this study (Argeriou, et al., 1986). Therefore, it was not surprising that multiple offenders were different from others for so many variables in this study.

Socio-demographic characteristics.

The results showed that people with multiple DWI arrests were more likely than others to be single and lower in age, socio-economic status and education. A recent study from Massachusetts which compared people with one and more than one DWI conviction resembles this study in terms of how DWI offenders were classified (Argeriou et al., 1986). The findings were similar as repeat offenders were more likely to be single, less educated and lower in SES. One difference, however, was that they found that repeaters and one-time offenders were nearly identical in terms of age. Another study of similar design also compared single versus multiple DWI offenders (Yoder & Moore, 1973). These authors did not find significant differences between the two groups for age, marital status, education or occupation.

Several studies have compared DWI offenders (i.e., one or more convictions) to drivers in the general population. The preponderance of evidence from these studies suggests that DWI offenders are more likely than the general population to be single, less educated, and lower in socio-economic status (Clayton et al., 1980; Hyman, 1968; Donovan et al., 1985). Recent reports have also shown that DWI offenders tend to be younger than drivers in the general population (Donovan et al., 1985; Donelson, 1985; Mercer, 1986). On the whole, results on socio-demographic characteristics from this study were consistent with results from other studies.

Variables related to drinking.

An interesting finding of this study was the relationships of variables related to drinking and DWI arrests. People who drank less frequently, who drank more Drinks Per Occasion and who reported high numbers of Most Drinks Ever Consumed in a Day were most likely to have multiple DWI arrests. Also, people with multiple DWI arrests tended to experience more intense reactions to drinking than others, although the relationship was not significant with Scheffe's test.

In research similar to this study, Argeriou et al. (1986) found that multiple offenders drank more per occasion, drank higher numbers of Most Drinks in a Day for the previous year, but more frequently than first offenders. A recent review of the literature has shown that people from the general population who consume more alcohol on average, more alcohol per occasion, and more frequently are more likely to be convicted for DWI (U.S. Department of Transportation, 1985). A study of an alcoholic population arrived at some similar findings, as drivers with more collisions and moving violations generally drank larger quantities of alcohol, but differed in that the high risk drivers drank less frequently (Selzer & Vonokur, 1974). Others have also observed that increased consumption of alcohol was more associated with risk of collision for infrequent than frequent drinkers (Brenner, 1965; Hurst, 1974). Overall, the results of this study are generally consistent with other studies with respect to quantities of alcohol consumed. For Frequency of Drinking, however, the results from other studies are mixed.

Variables related to driving.

Four variables related to driving were examined: Frequency of Drinking and Driving; Dangerous Styles of Driving; Dangerous Styles of Drinking and Driving; and

Driving Expressiveness. Multiple offenders were significantly different than others for the latter two variables in that they scored higher on both Driving Expressiveness and Dangerous Styles of Drinking and Driving. No relevant studies have been found that explored the relationships between these variables related to driving and DWI.

Psychosocial variables.

Multiple offenders were significantly different from others for only three of nine psychosocial variables. Multiple DWI arrestees experienced more undesirable Life Events and scored higher on Disrespect for Authority and lower for Social Desirability than people with zero or one arrest. Multiple offenders were not significantly different from non-repeaters for the six other psychosocial variables: Responsibility, Harm Avoidance, Self-esteem, Impulsiveness, Depression, and Aggression.

No studies have been found that directly examine these psychosocial variables for zero or one time DWI offenders in comparison to repeat offenders; however, there are studies that have investigated the importance of these variables for DWI offenders compared to drivers from the general population. In several of these studies, Disrespect for Authority, as measured by convictions for other types of

crimes, were associated with a greater than expected proportion of DWI (McCord, 1984; Waller, 1967; Yoder & Moore, 1973; Zelhart et al., 1975). Greater numbers of stressful life events in the previous year were shown to be associated with DWI for seniors (Wells-Parker et al., 1983). The results from this study for these particular variables are consistent with those in the literature.

The other psychological variables, which were not found to be associated with DWI in this study, have been found to be predictors in several studies that compare DWI offenders to the general population. All the psychological variables (i.e., impulsiveness, depression and aggressiveness, and less responsibility) were associated with DWI in such a study by Selzer and Barton (1977) and several were implicated in a study by Donovan et al. (1985). Aggression has often been cited as a predictor of DWI (McCord, 1984; Donovan et al., 1985). As previously outlined, the different results of the present study might be attributable to the different samples or comparison groups used.

It was thought possible that the psychological traits (i.e., aggression, impulsivity, etc.) would manifest themselves in terms of driving behaviours, which in turn would enhance an individual's likelihood of being arrested

for DWI. Failure to find important relationships also may be attributable to people not displaying these traits consistently in different situations (Mischel, 1973). A possible remedy to this problem is to redefine these traits in terms of the specific situation of interest (Mann & Vingilis, 1985). For example, if aggression was defined in terms of the specific driving situation of interest, then stronger predictive power might result. Aggression might be described as driving over the speed limit when impaired by alcohol. Results from the present research provide some support for this suggestion. Although aggressiveness was not related to DWI arrests, Dangerous Styles of Drinking and Driving were. This latter scale measures what could be best described as aggressive drinking and driving. This description of variables in terms of both personal and situational factors, called an interactionist approach, has recently been suggested as a worthwhile model towards the study of drinking and driving (Mann & Vingilis, 1985).

6.2.3 The Relationship of Occurrences of Collisions and Moving Violations with DWI Arrests.

Few of the psychosocial variables were related to DWI arrests. The review of the literature showed that these variables were implicated in other types of high risk driving (i.e., traffic collisions or moving violations). Since the psychosocial variables were not associated with

DWI arrests, one might also expect that increases in DWI arrests would not be associated with increased collisions or moving violations. Analyses showed that there were no significant differences among DWI arrested groups for moving violations, traffic violations and collisions without alcohol involvement.

Although no differences were found in non-alcohol related driving incidences for the arrest categories, other investigators have arrived at different conclusions. Several studies have compared driving records of DWI offenders and people from the general driving popuation. Mercer (1985), as well as Maisto et al. (1979) and Perrine (1975) have provided convincing evidence that DWI offenders have worse driving records than people in the general driving population. However, none of these studies controlled for amount of drinking and gender. Therefore, different results of other studies may be attributable to the fact that DWI offenders tend to be heavy drinking males, who as a group tend to have worse driving records than the general driving population. The comparison group of general drivers has a greater proportion of females and light drinkers. In this research, both the DWI and comparison groups were heavy drinking males, which may account for the differences found.

6.2.4 The Multivariate Analyses

While some other studies have used multivariate analyses, none of them included the same set of variables as this study (Selzer & Barton, 1977; Wilson & Jonah, 1983). Since the combinations of variables were different, comparisons between this study and other studies for the multivariate analyses are not very useful. Therefore, such comparisons will not be discussed in this section. The first model developed for this study included all main effects. Only two variables, Most Drinks in a Day and Frequency of Drinking, were statistically significant. Several significant variables in the bivariate analysis were unimportant in the multivariate analyses: SES, Number of Drinks Per Occasion, Driving Expressiveness, Disrespect for Authority and Social Desirability. The reason these variables became unimportant was that they were correlated with other variables that better explained variation in DWI arrests. For the stepwise logistic regression the variables of Most Drinks, Age and Dangerous Styles of Drinking and Driving entered the model. These analyses were useful to show that a smaller set of variables is nearly as effective in predicting DWI arrests.

No studies have been found where interactions of variables were examined in relation to DWI. In this study, the importance of interaction terms that included confounders was empirically assessed. The nature of the interactions provides useful insight for understanding DWI arrests. Education was found to be a significant effect modifier with Most Drinks in a Day, Number of Drinks per Occasion and Frequency of Drinking. Each of these three variables was more strongly associated with DWI arrests for less educated people than for those with more education. A possible explanation for this finding is that more educated people may be more socialized or aware of the physical dangers of DWI, which in turn may be associated with either lower frequency of drinking and driving or less Dangerous Styles of Drinking and Driving. Age was also a significant effect modifier for the relationship between Frequency of Drinking and DWI arrests. Lower frequency of drinking was more strongly associated with DWI arrests for people of higher age than people of lower age.

6.3 Generalizability of the Results.

Selective bias, occurs when the participants are not representative of subjects eligible to participate in the study and such bias may reduce the generalizability of the results. Selective bias is most critical in studies where

the main purpose is the estimation of population parameters or odds ratios (Kleinbaum et al, 1982). Although this was not the primary objective for this study, selective bias attributable to the response rate could influence interpretation of the results for this study.

Participants were compared to non-participants in order to assess the possible influence of selective bias. The results of these comparisons were reported in section 5.2.2. Participants and non-participants were similar for most of the variables examined. The exception was that participants tended to be more highly educated and reported more emotional or nervous upsets. If a disproportionate percentage of the less educated non-participants also had DWI arrests, then the relationship between educational level and DWI arrest might have been stronger than that reflected in this study. However, there was no evidence of selective bias for the dependent variable DWI arrests, as participants and non- participants had approximately the same number of arrests or convictions for DWI.

Another aspect of generalizability is whether the participants were representative of male alcohol-dependent people in treatment at other hospitals. It was felt that the results would be more generalizable with use of patients

from two hospitals than one hospital alone. The Donwood and St. Thomas were similar for age, marital status and amount of drinking. Participants at the Donwood were more educated and higher in terms of socio-economic status. It is likely that people at St. Thomas are more representative of people at most treatment institutions in terms of these latter variables, since the Donwood is known to treat people of higher SES. The Donwood was once a private hospital and it has traditionally admitted people of higher education and socio-economic status than other institutions. Therefore, the sample as a whole for this study was likely more highly educated and of higher socio-economic status than male alcoholics in other institutions. With regard to other characteristics, it seems reasonable to expect the sample is representative of male alcoholics in other treatment facilities.

One reason this study focussed on male alcoholics is that they have been previously identified as a very high risk group for DWI. The results can be generalized to male alcoholics in treatment, but not to other people such as females or relatively lighter drinkers in the general population.

6.4 Measurement Issues with Self-Reported Data.

Most of the information for this study was obtained by self-reports. Some authors have suggested that self-reported data from alcoholics is likely biased because denial is an important characteristic of alcoholism (Gerard & Saenger, 1966). However, recent studies, as described below, on the validity of self-reported data from alcoholics suggest that self-reported information is reasonably accurate for a number of alcohol related indices. This appears especially true for alcoholics in treatment.

Midanik (1982) reviewed the literature on the validity of self-reported information from alcoholics. Sixteen studies of collateral reports in clinical populations indicated strong agreement between patients and collateral reports with no consistent direction of error. When self-reports were compared to official documents, studies showed very high agreement (i.e., about 85 percent) with a slight bias in the direction of over-reporting. These studies indicate that self-reported information from alcoholics in treatment is sufficiently reliable and valid for research purposes.

In this study, comparisons were made between numbers of self-reported DWI arrests and official driver records.

Total agreement occurred for 83.5 percent of the cases. About 10 percent of the of the sample over-reported. Such over-reporting seemed explainable, as DWI arrests could have occurred in jurisdictions other than Ontario and not be noted on the official driving records. Possible explanations for under-reporting were explored and it seemed unlikely that many people intentionally lied. The comparison of self-reports with official records from this study is consistent with other similar studies.

6.5 Limitations of the Study.

The overall objective of this study was to determine if certain psychosocial characteristics were related to DWI arrests for male alcoholics in treatment. The cross-sectional design was useful in demonstrating whether relationships between variables exist. The research revealed which variables are likely related to DWI arrests, but the design was limited in that the time sequence between the predictor variables and DWI arrets could not be assessed.

Information bias occurs in situations where measurements of conditions are systematically inaccurate (Kliegnbaum, et al., 1982). It may have been a factor for variables such as Frequency of Drinking and Driving and

Dangerous Styles of Drinking and Driving. Peoples' assessments of driving behaviour may have been altered after being arrested for DWI (e.g., they may have felt they drove while impaired more or less frequently, or they drove while impaired more or less dangerously than before their DWI arrest). Such potential bias could not be assessed, because this study was cross-sectional. Information bias for the dependent variable of DWI arrests was negligible since the information was validated with driver records. Information bias for many the psychosocial characteristics was not considered likely because most scales were selected on the basis of their validity and reliability. The variables explored are characteristics that are stable over time and are unlikely to be altered by a DWI arrest.

DWI arrests are subject to several sources of variability which may mean that it is not a perfect reflection of drinking and driving behaviour. Factors such as geographical residence may be related to whether an individual is arrested for DWI. For example, Metro Toronto has 24 hour roadside spot checks for impaired drivers, whereas other jurisdictions do not. Enforcement practices vary across the province due to either police discretion or varied practices to deal with inebriated drivers. There was evidence in this study that police discretion exists as about 43 percent of

the sample indicated they were impaired when stopped by police, but were not asked to take the breathalyzer. Also, some police officers might have difficulty detecting impaired drivers. The different sources of variation may mean a given individual's number of DWI arrests may have been classified differently, if he encountered different circumstances.. To this extent DWI arrests are not an accurate measure of DWI.

Also, the number of DWI arrests people had was related to the point in time when the study was conducted. For example, people with zero or one arrest could receive a DWI arrest at a later date, and therefore would be categorized differently at another point in time. Similarly, since only DWI arrests within the last 10 years were recorded, some people may have been multiple offenders long ago, but were categorized as having zero or one arrest for this study. However, this cut-off period for DWI arrests was thought necessary to ensure that older and younger people would have approximately the same number of years at risk for DWI arrest.

6.6 Policy Implications.

The policy implications of this study are somewhat limited because results can only be generalized to male

alcoholics in treatment. The results may be more useful for improving our theoretical understanding of DWI.

The descriptive results provided evidence that a very large majority (approximately 88 percent) of male alcoholics have driven while impaired by alcohol. Over one half of the sample has also been arrested for DWI, and about one half of this group has been arrested more than once. The data suggest that general deterrence was effective in total abstinence of drinking and driving for only 12 percent of the participants, at most. There was some evidence of a specific deterrent effect for people arrested for DWI. For example, 21 people reported they stopped drinking and driving after they were arrested for DWI. Another 32 people reported they still drank and drove, but more carefully than before their arrest. It seems unlikely that specific deterrence had an impact on multiple offenders. The large proportion of alcoholics arrested for DWI, as well as the very large proportion of people who reported they drove while impaired, suggests that this population is not easily dissuaded from engaging in this behaviour.

It is interesting that multiple offenders were quite different from one time offenders in terms of the predictor variables studied. Differences found between groups in

terms of Dangerous Styles of Drinking and Driving and alcohol related collisions were especially interesting. Multiple offenders represent the most severe public menace. One policy implication is that differential interventions could be implemented for alcoholics with one offence and multiple offences. Multiple offenders might be given more intensive rehabilitation, treatment or punishment than one time offenders. Currently multiple offenders do receive more severe penal sanctions than one time offenders, and the results of this study might be used to justify such differential policies.

It is possible that information from this study might be useful for the development of rehabilitation programs for DWI offenders. For example, Most Drinks Ever Consumed in a Day and Driving Expressiveness were signficantly related to multiple DWI arrests. Perhaps methods, such as behaviour modification, could be employed whereby attempts were made to reduce these characteristics. If reductions of these characteristics occurred, followed by significant reductions in DWI behaviour, then the program could be assessed as successful.

The step-wise model may be useful for predicting which alcoholics are most likely to become multiple

offenders. People predicted to become recidivists could then receive specialized interventions for treatment or rehabilitation. Although the model may predict some people as multiple offenders when they are not likely to repeat, if the treatment program was not aversive, the consequences of misclassification would not be severe. Another error that could occur is when people are predicted not to recidivate, but actually will repeat their offence. Such people should receive an intervention but do not. Although such errors are not desirable, these misclassifications might be justified as a cost saving measure.

Given the potential of a predictive model, described in the aforementioned paragraph, there are limitations that need to be overcome. One problem is that if people knew that treatment was contingent upon their answers to the questionnaire, it seems likely they could deliberately respond in a manner to alter the outcome. This is particularly true for variables related to drinking and variables related to driving. Another problem is that the accuracy of the model for other groups, such as non-alcoholics and females must be assessed before being used on these populations. At present, the model has limited generalizability.

6.7 Directions for Future Research.

Methodologically, most studies on DWI have not used comparison groups that were matched in terms of two potential confounding variables of gender or alcohol consumption. Since people in the DWI and comparison groups were males and heavy consumers of alcohol, it is more likely that the variables identified as useful predictors were causally related to DWI. Future research should pay more attention, than studies in the past, to matching the DWI group and comparison group in terms of potential confounding variables, such as alcohol consumption, gender, and age. This approach could result in the elimination of variables previously thought to be implicated for DWI. Also, a drawback of this study is that the results can only be generalized to male alcoholics in treatment. Future studies that investigate a wider range of people will improve generalizability of the results.

In future studies, analyses should not be conducted where single offenders and multiple offenders are combined, unless there is empirical evidence to support such combination of groups. Although, these groups were combined for many studies, justification of this procedure was rarely provided.

Since this study was cross-sectional in design, inferences about causation could not be made. Future studies, with longitudinal designs, will be more useful in understanding antecedent variables that are related to DWI. Such studies should focus on variables that may not be consistent over time. Frequency of Drinking and Driving and Dangerous Styles of Drinking and Driving are two measures that may increase an individual's chances of being arrested for DWI. Of particular interest, is the relative importance of each of these variables for predicting DWI arrests. For example, what is the probability of DWI arrest for people who drink and drive frequently, but do so with more caution than others. Also, to what degree can people compensate for their impairment while driving? Another related area of interest is to determine what variables best predict each of these two kinds of drinking and driving behaviours. Although longitudinal studies would be costly in terms of resources and time, they would provide an improvement over previous research.

Since this study was exploratory, studies are required to confirm the results. Findings showed that Group 0 and Group 1 were similar, yet both of these groups were dissimilar from Group 2. These, and other findings of this study were suggested by the data, rather than having been

tested on a priori grounds. A limitation of exploratory research is that the results can not be considered confirmatory. Future studies are required to specifically test hypotheses that were suggested by the data of this study.

APPENDIX A

LIST OF DEFINITIONS

List of Definitions

Alcohol dependent person - For the purposes of this research, alcohol dependent person and alcoholic are treated as equivalent.

Alcoholic - A person that displays enough symptomatology to be classed as having a severe problem with the abuse of alcohol. Hangovers, delirium, tremens, tolerance to alcohol, craving for alcohol, overall consumption of alcohol, black outs or loss of control while drinking are some examples of symptoms used to define alcoholism. For this study an alcoholic was defined as a person admitted for treatment of an alcohol problem at the Donwood Institute or St. Thomas Addiction Unit.

B.A.C. - Blood alcohol concentration of alcohol

DWI - Driving while impaired. This is determined by a blood alcohol count of 80 mg% alcohol or greater. Blood alcohol content is primarily a function of: (a) amount of alcohol ingested; (b) body weight; and (c) time or duration of drinking.

DWI (arrested) - people arrested under the criminal code for driving a motor vehicle with a BAC of at least 80 mg%, driving while impaired by alcohol and/or refusal to provide a breath sample.

DWI offender - someone arrested or convicted for any of the offences listed above.

DWI (self-reported) - People who admit they have driven on some occasion with a BAC of at least 80 mg%.

General Deterrence - A theory that suggests the threat of penal sanctions prevents people from committing a particular crime.

Had been Drinking - A person that has consumed alcohol but is not legally impaired.

High risk Driving - High risk driving refers to and is measured by the frequency of occurrences of driving while impaired (DWI), DWI convictions, moving violations and drivers responsible for traffic collisions. These conditions are risks because they increase the likelihood of traffic related morbidities or mortalities.

Item - The actual questions used in this study or other studies, which are combined to form scales.

Moving Violation - A violation of the Ontario Highway Traffic Act (e.g., speeding, failure to come to a complete stop at a stop light or stop sign, illegal turns, etc.).

Predictor Variable - A variable that is strongly associated with another variable. The predictor does not necessarily imply a cause-effect relationship.

Recidivist - An individual who is arrested or convicted for more than one criminal act. People arrested for two or more DWI offences are recidivists.

Specific Deterrence - A theory that suggests that people who receive punishment for a crime are unlikely to re-commit that crime.

Traffic Collision - A traffic accident that results in damages to one vehicle of at least $200.00.

Traffic Violation - Includes all moving violations as well as other vehicle violations such as driving while disqualified, improper seat belt assembly or excessive noise.

APPENDIX B

SUMMARIES OF FINDINGS FROM STUDIES IN THE REVIEW OF THE LITERATURE

APPENDIX B

TABLE 1. Psychosocial factors associated with traffic collisions or moving violations.

AUTHOR/DATE	SAMPLE/GROUP(S)	N	PSYCHOLOGICAL	SOCIAL	STATISTICAL TESTS
Reamish & Malfetti, 1962	(1) male referrals to juvenile court with 2 or more moving violations (2) licensed males, 16-19 years old, from high schools with no violation (other combinations of drivers were also used)	84 186	-emotional instability	-non-conformity -sociability -Personal relations -religious and political activity	student t test
Conger et al., 1959	Airmen, Denver/ (1) 2 or more collisions (2) No collision	10 10	-hostile -intolerant of tension -self centered -preoccupied with fantasy satisfactions -fearful of loss of love		
Finch & Smith, 1970	drivers killed in automobile collisions	25		-stressful events such as job problems, financial difficulties and interpersonal conflicts	chi square ($p < .001$)
Marano et al., 1975	Dept. of Motor Vehicle files/ (1) 3 more collisions (2) collision free	196 231	-risk taking -using a car as expression of emotion	-low socioeconomic status -social deviance -unmarried	multiple regression, ANOVA, cluster analysis, chi square

AUTHOR/DATE	SAMPLE/GROUP(S)	N	PSYCHOLOGICAL	SOCIAL	STATISTICAL TESTS
Jamison & McGlothlin, 1973	Psychotherapy patients/ (1) 1 or more accidents (2) 2 or more accidents (3) No accidents (4) No accidents or violations	 43 61 121 52	-sensation seeking	-values -owns residence -religious attendance	
MacMillan, 1975	random sample of drivers	643		-contact with social agencies -social problem score -younger age -driving exposure	chi square ($p < .05$)
Mayer & Treat, 1977	licensed drivers in a psychology course (1) 3 or more collisions (2) collision free (1) drivers in collisions at fault (2) drivers in collisions not at fault	 10 10 177 110	-impulsivity -external locus of control -negativism -risk taking -general psychopathology -anxiety	-antisocial tendencies -school socialization -juvenile delinquency	
McGuire, 1956	(1) recent collision(s) and moving violation(s) (2) accident and violation free	67 67	-psychopathic deviate -schizophrenia -ego defensive -need persistence		unspecified statistical tests ($p < .05$)
McMurray, 1970	(1) individuals involved in divorce proceedings (2) entire driving population of Washington	410		-the total number of accidents and violations was 10% higher for persons undergoing divorce proceedings. Driving records in the year of divorce was worse than average. Driving records were worst 3 months following divorce proceeding.	percentages

AUTHOR/DATE	SAMPLE/METHOD(S)	N	PSYCHOLOGICAL	SOCIAL	STATISTICAL TESTS
Parry, 1968	every nth vehicle/ 3 collision groups: very serious, serious and minor	382	-aggression -anxiety	-younger age -lower social class	student t test correlation
Rommel, 1959	high school students/ (1) 2 or more collisions (2) no collisions	25 25	-hypomania -psychopathic deviate -unsocialized -driving attitude		student t test
Selzer, 1969	(1) drivers involved in fatal collisions (2) controls, matched for age, sex and residence	96 96	-paranoid -previous suicide attempt -previous violence -depression	-lower social class -vocational and financial stress -personal crimes	chi square tests
Selzer & Vinokur, 1974	Michigan drivers/ (1) drivers sent to school for moving violations (2) drivers renewing their license	172 102	-aggression -physical stress responses	-lower income -alcohol use -disturbance with in-laws	correlations, ($p < .05$)
Shaw, 1965	Bus drivers, South Africa/ groups defined by psycho-social tests traffic collision is the dependent variable	470	-lacks self-control -aggressive -self-centred -antisocial attitudes -over-confident -blame avoidant -resists authority -lacks insight -fatalistic -mentally defective -unintelligent -disorganized -emotionally unstable -tension ridden -sensitive to criticism -indecisive -poor concentration -easily intimidated -suicidal tendencies -addicted to alcohol -personality that predisposes to drink or abuse drugs		chi square tests, which includes all variables, was used on a previous sample ($p < .01$)

AUTHOR/DATE	SAMPLE/GROUP(S)	N	PSYCHOLOGICAL	SOCIAL	STATISTICAL TESTS
Shuman et al., 1967	Unmarried male drivers, aged 16-24 in Michigan/ Number of traffic accidents or moving violations	288	-impulse expression -frustrations -anxieties	-owns car -employed vs in school	no statistical test
Shuster & Gulliford, 1964	(1) High traffic accidents or moving violations (2) No accidents or moving violations	2000	-need for freedom -irresponsible -maladjusted -aggression -resentful of authority -lacks responsibility -impulsive -driving attitudes -ambitiousness -personal relations	-number of employers	Regression analysis
Tillman & Hobbs, 1949	Taxi drivers, London, Ont. (1) High collision (2) Low collision (1) 4 or more collisions (2) Control group matched on age and sex	20 20 96 100	-aggressive -antisocial characteristics -immature -easily distractable -impulsive	-parental divorce -poorer work records -known to community agencies	Primarily descriptive study
Waller, 1967	Oakland, California (1) moving violations traffic collision violation plus warrant (2) no traffic collisions or moving violations	131 117 19 150		-known to community agencies	Unspecified statistical test [illegible]
Willet, 1971	(1) severe motor offenders (2) licensed drivers without moving violations	187	-assertive -self confident -lower intelligence -less prone to feelings of guilt -less self control		student t tests

Notes on Table:

In some instances, more than one comparison group was used, but in the table only the most relevant comparison group is included. Terms used are usually the terms used by the original authors, but occasionally terminology was changed to enhance clarity and permit brevity. Studies that focussed primarily on socio-demographic variables are not included. In some instances variables found to be positively related to collision or moving violations are not included, if they are not related to the variables of interest, as outlined in the review of the literature.

Table 2. Psychosocial factors associated with driving while impaired.

AUTHOR/DATE	SAMPLE GROUPS	N	PSYCHOLOGICAL	SOCIAL	[illegible]
Argeriou et al., 1986	Massachusetts (1) Multiple DWI offenders (2) First time DWI offenders	2,412 18,981		-unemployed -lower income -more alcohol related arrests -more previous treatments for alcoholism -more drinks per occasion -more mean most drinks -higher BACs at arrest -more frequent drinker	[illegible]
Donovan et al., 1985	(1) DWI arrestees (2) general driving population	172 154	-depressed -lower emotional adjustment -sensation seeking -hostility/aggression	-lower age -lower education -lower SES	[illegible]
Hyman, 1968	California (1) DWI offenders (2) Census of people in California	794		-ages 21-[illegible] -lower [illegible] -males	[illegible]
McCord, 1984	Youth program in 1936: (1) Convicted for DWI (2) Not convicted	18 226	-self confidence -aggression -childhood security and independence	-convictions for other crimes -parental conflict, depression and alcoholism	[illegible]
Norstrom, 1978	Random sample of Swedish drivers: (1) self-reported DWI (2) no self-reported DWI	1,541	-moral attachment to the law	-age (under 30 yrs) -males -unmarried -annual mileage -higher [illegible] of alcohol	[illegible]
Perrine, 1975	Vermont (1) DWI offenders (2) Three groups of drivers defined by skill level and whether they passed or failed a drivers examination	130	-alcohol attitude -violation attitude -accident attitude	-older age -lower SES -educational level -previous driving record	[illegible]

AUTHOR/DATE	SAMPLE GROUPS	N	PSYCHOLOGICAL	SOCIAL	[illegible]
Selzer & Barton, 1977	Michigan (1) DWI offenders (2) Persons renewing drivers license	306 294	-tension relief by drinking -social relaxation -effects of drinking -methods of coping -high strung -nervous -neuroticism -self esteem -self control -responsibility -depression -aggression	-family problems -divorced or separated -blue collar -old age -amount of drinking per occasion	[illegible]
Waller, 1967	Oakland, California (1) Consecutive arrests for DWI (2) No traffic collisions	150 150		-known to welfare department -known to probation department -treated in state mental hospital -seen at alcoholism clinic -known to family service agencies	[illegible]
Wells-Parker et al., 1983	(1) DWI convictions aged 60 and over (2) Control group of non-offenders matched for drinking and age	92 68	-stressful events		[illegible]
Wilson & Jonah, 1985	Random sample of Canadian drivers (1) self-reported DWI (2) No self-reported DWI	2000	-high risk behaviors -attitudes towards DWI and legal authorities or practices	-younger age -been with someone impaired -average alcohol consumption	[illegible]
Yoder & Moore, 1973	California (1) Repeat DWI offenders (2) One time DWI offenders	104 206		-previous arrests for any cause -higher BACs at arrest -more alcoholics	[illegible]
Zelhart et al., 1975	Alberta (1) convicted DWI offenders participation in an impaired drivers program (2) volunteers from the RCMP and the Attorney General's office. Moderate drinkers or abstainers.	201	-super ego -sociability -inferiority	-more contact with legal authorities	[illegible]

Notes on Table. In some instances more than one comparison group was used, but in the table only the most relevant comparison group is included. Terms used are usually the terms used by the original authors, but occasionally, terminology was changed to enhance clarity and format brevity. In some instances variables found to be positively related to DWI are not included if they are not related to the variables of interest, as outlined in the review of the literature.

TABLE 3. Studies of psychosocial variables and high risk driving in alcohol populations

AUTHOR/DATE	SAMPLE/GROUP(S)	N	PSYCHOLOGICAL	SOCIAL	STATISTICAL TESTS
Filkens et al., 1970	Alcoholics in treatment/ (1) no collisions (2) one collision (3) 2 or more collisions (1) no moving violations (2) 2 or 3 moving violations (3) 4 or more moving violations	 727 336 184 698 292 297	-neurotic and emotional diagnosis	-deviancy in terms of criminal records and mental hospitalizations -family problems associated with stress -suicide attempts -single, separated, divorced	chi square tests
Mozdzierz et al., 1975	Hospitalized alcoholics/ (1) 1 or 2 collisions, or 5 or more moving violations (2) 1 or 2 collisions or moving violations	 50 50	-restraint -depression -hypermania -impulsivity -recklessness -irresponsibility	-social boldness -personal relations	student t tests discriminant analysis
Selzer, 1961	Alcoholics and their driving behavior	3	-hostile -depressed -drinking helped release hostilities		descriptive study
Selzer & Vinoker, 1974	Alcoholics were defined according to the number of collisions in previous 12 months	283	-aggression	-total readjustment to undesirable life events -physical stress responses -stress and tension -disturbance with parents or in-laws	regression analysis chi square tests
Zelhart, 1972	3 groups of alcoholics: (1) inhibited and frustrated (2) poor ability to interact socially (3) unsocialized and aggressive	73	-Group (1) had the significantly worse driving records. -Group (1) had the best records.		chi square tests discriminant analysis

APPENDIX C

CONSENT FORMS

The University of Western Ontario

Department of Epidemiology & Biostatistics
Faculty of Medicine
Kresge Building
London, Canada
N6A 5B7

Letter of Explanation and Consent

I am involved in a study of patients admitted to the Addiction Unit. The study is about the relationship between various characteristics of patients with alcohol problems and driving behavior.

The study focuses on persons at St. Thomas with certain characteristics. For each question, please check the appropriate box.

A. Are you a male?	yes ☐	no ☐
B. Are you between the ages of 19 and 65?	yes ☐	no ☐
C. Have you entered the St. Thomas program for a problem with alcohol?	yes ☐	no ☐
D. Have you driven a car at least 3,000 miles (or 5,000 km) in the last 3 years?	yes ☐	no ☐
E. Have you had an Ontario Driver's License sometime within the last 3 years?	yes ☐	no ☐

If you answered yes to all these questions, you are eligible to participate in the study.

The purpose of this letter is to request your participation, which will involve completing a questionnaire, that should take about one hour to complete.

All information obtained for this study will be treated with the strictest confidence unless disclosure is required by law. Information will be collected from a group of patients and combined without names. Only group results will be reported. Information obtained will be kept locked, with access limited only to the project's staff, and the information will only be used for research purposes. Additionally, since your name will not appear on the questionnaire, the information you provide will be anonymous.

If you do not wish to participate in the study, treatment you will receive at St. Thomas will not be affected. Furthermore, you are free to withdraw from the study at any time without jeopardy to your future care. You may refuse to answer any of the specific questions that you wish.

Do you have any questions? If you require any more information in the future, please feel free to contact Scott Macdonald at (519) 679-2714 (collect). If you wish to participate, please sign here.

NAME: _____ SIGNATURE: _____
Please print

The University of Western Ontario

Department of Epidemiology &
Biostatistics
Faculty of Medicine
Kresge Building
London, Canada
N6A 5B7

Consent for Release of Information

The purpose of this form is to obtain your permission to examine all the information contained in your driving records.

I, the undersigned , authorize Mr. Macdonald to contact the Ministry of Transportation and Communications to obtain information from my records.

Signature _____

Name (Print) _____

Birthdate _____

Present Address _____

Ontario Driver's License Number _____

The University of Western Ontario

Office of Research
& International Education
Stevenson Lawson Building
London Canada
N6A 5B8

TO: Mr. Scott Macdonald,
Dept. of Epidemiology & Biostatistics.
KRESGE BLDG.

RE: 1985-86 HEALTH SCIENCES STANDING COMMITTEE ON HUMAN RESEARCH
STATEMENT OF REVIEW NO. 934

TO WHOM IT MAY CONCERN:

The Health Sciences Standing Committee on Human Research consisting of

(1) D. Bocking, Vice-Provost Health Scientes (Chairman)
(2) H. W. Baldwin, Assistant Vice-President (Research)
(3) R. N. Green, Victoria Hospital Representative
(4) G. Wisenberg, St. Joseph's Hospital Representative
(5) C. N. Ghent, University Hospital Representative
(6) B. Hoffmaster, Office of the President Representative
(7) R. Solomon, Office of the President Representative
(8) E. Good, Office of the President Representative
(9) J. E. Brown, Faculty of Medicine Representative
(10) J. Robertson, Faculty of Medicine Representative
(11) J. T. Hamilton, Faculty of Dentistry Representative
(12) Faculty of Nursing Representative
(13) W. S. Yovetich, Faculty of Applied Health Sciences Representative

has examined the research project entitled "PSYCHOSOCIAL CHARACTERISTICS OF ALCOHOLICS IN TREATMENT WHO DRIVE WHILE IMPAIRED"

as proposed by Mr. Scott Macdonald

and considers it to be ethically acceptable under conditions of the University's policy on research involving human subjects.

23 SEPTEMBER 1985
Date Approved

H. W. Baldwin,
Assistant Vice-President
(Research)

c.c. L. Pederson - Advisor

APPENDIX D

TABLES ON RELIABILITY AND VALIDITY OF THE SCALES

APPENDIX D

TABLE 1: Split-half reliabilities.

	Psychiatric Sample N=83	College Sample N=84
Aggression	.74	.63
Harm Avoidance	.82	.91
Impulsivity	.77	.85
Infrequency	.69	.71
Desireability	.52	.68

from Jackson (1967)

TABLE 2: Correlations between PRF-E and the Cattell High School Personality Questionnaire.

(N=1862)

PRF-E Scale	HSPQ Scale													
	A	B	C	D	E	F	G	H	I	J	O	Q_2	Q_3	Q_4
Aggression	-09	02	-21	41	19	33	28	-09	-24	21	18	02	-29	29
Harmavoidance	09	-05	-11	04	-29	-40	14	-24	41	-10	10	-13	04	14
Impulsivity	00	02	-29	28	02	35	-37	-11	-03	09	24	-07	-38	22

Note: Decimals omitted. These data were collected by J.R. Nesselroade and P.B. Baltes. HSPQ scale names corresponding to the letters above are as follows: (A) agreeableness; (B) intelligence; (C) emotional stability; (D) excitability; (E) dominance; (F) surgency; (G) dependability; (H) shyness; (I) toughmindedness; (J) individualism; (O) self-confidence; (Q_2) self-sufficiency; (Q_3) self-control; (Q_4) tenseness.

from Jackson (1967)

TABLE 3: Correlations between the scale of responsibility and other scales that measure a similar construct.

	Responsibility
.77	BPI Law Abidance
.60	BIPI Law Abidance
.33	BIPI Trustfulness
-.28	Reported non-medical drug use
.33	Reported church attendance
-.21	Reported use of alcoholic beverages
.53	Self rating of "Careful to avoid any behavior which might compromise my ethical standards."
-.50	JHV Situational Dilemma - Ethical Risk Taking
-.62	JHV Personality Inventory - Ethical Risk Taking.
.30	Nomination: "Has strong conscience; behaves responsibly"

From Jackson, 1974

Table 4

Pearson Correlations of Items with Its Own Scale and the Social Desirability Scale

ITEMS FROM THE SCALE OF DANGEROUS STYLES OF DRINKING AND DRIVING.	DANGEROUS STYLES OF DRINKING AND DRIVING	SOCIAL DESIRABILITY
a) I drove faster than the speed limit.....	.66	-.20
b) I drove at the spped limit or slower.....	.57	-.15
c) I would take a risk while driving for the thrill of it.....	.65	-.21
d) I avoided heavily travelled streets.....	.17	.03
e) I used my horn a lot.....	.16	-.19
f) I tried to pay more attendtion by looking in rear mirror and all around.....	.45	.00
g) I would break a traffic law if it meant getting out of a difficult situation.....	.51	-.22
h) I drove carefully.....	.64	-.10
i) I cut in and out of traffic.....	.58	-.20
j) I watched out for police when driving....	.32	.08
k) I had difficulty staying in my lane.....	.34	-.19
l) I tried to obey all traffic laws.....	.56	-.23
m) I drove recklessly.....	.52	-.18
n) I would brake rather than accelerate to get out of a difficult situation.....	.44	.04
o) I would take corners as fast as possible.	.60	-.22
p) I found it easy to concentrate on my driving.....	.37	-.12

Table 4 con't...

ITEMS FROM THE SCALE OF UNSOCIALIZED CHARACTERISTICS.	UNSOCIALIZED CHARACTERISTICS	SOCIAL DESIRABILITY
At times I have a strong urge to do something harmful or shocking.....	.49	-.34
My conduct is largely controlled by the customs of those about me.....	.23	.10
My parents often objected to the kind of people I went around with.....	.53	-.34
It is wrong to break the law.....	.19	.01
It does not matter to me if I have a criminal record.....	.44	-.09
The majority of my friends have not been arrested for a criminal offense.....	.50	-.19
Most of my friends drink and drive.....	.46	.18
If I have been drinking a lot, I usually make arrangements to have a friend drive me home afterwards.....	.46	.18
I do not argue with police.....	.57	-.29

ITEMS FROM THE SCALE OF DRIVING EXPRESSIVENESS.	DRIVING EXPRESSIVENESS	SOCIAL DESIRABILITY
I find driving a form of relaxation, which I use to relieve my tension.....	.56	.03
The only purpose of a car is to provide transportation from one place to another.....	.45	-.10
I would rather have a 400 horsepower engine in an old car than a low powered engine in a new car.....	.43	-.15
When I am upset driving helps soothe my nerves.....	.63	-.04
I do not like to drive a car when I am angry.....	.57	-.19

Table 4 con't...

I feel powerful when I drive a car.....	.46	-.20
I drive more aggressively when I have been drinking.....	.32	-.23
A car is not a status symbol.....	.31	-.14
I enjoy driving after I have had several drinks.....	.52	-.28
I do not enjoy driving around when I am not going any place in particular.....	.51	.19
I frequently drive with my car radio on very loud.....	.47	.19
I do not like to drive a car when I am very depressed.....	.55	.19

ITEMS FROM THE SCALE OF DANGEROUS DRIVING.	DANGEROUS DRIVING	SOCIAL DESIRABILITY
I am a cautious driver.....		
I am a cautious driver.....	.50	-.19
Defensive driving is not necessary because I shouldn't have to compensate for other people's errors.....	.19	-.03
I drive aggressively.....	.54	-.13
I do not find it difficult to keep to the speed limit even when there is an open road ahead and the speed limit is 50 km/hr.....	.60	-.21
I am careful to come to a full complete stop at stop signs.....	.59	-.21
Some of my friends have told me that I am <u>not</u> a very good driver.....	.52	-.24
I rarely get distracted when I drive.....	.63	-.32
I do not usually drive over the speed limit.....	.68	-.24

APPENDIX E

QUESTIONNAIRE FOR THIS STUDY

TODAY'S DATE [ ][ ][ ][ ][ ][ ]
DD MM YR

I - MAIN QUESTIONNAIRE

INSTRUCTIONS FOR PART I

On the following pages you will find a series of statements which a person might use to describe himself. Read each statement and decide whether or not it describes you.

If you agree with a statement or decide that it does describe you, then place a check mark (√) in the box labelled T for True. If you disagree with a statement or feel that it does not describe you, then check (√) the box labelled F for False.

ANSWER EVERY STATEMENT *either True or False, even if you are not completely sure of your answer.*

KEY TO NAMES OF THE SCALES

R - RESPONSIBILITY	HA - HARM AVOIDANCE
DA - DISRESPECT FOR AUTHORITY	I - IMPULSIVITY
SD - SOCIAL DESIREABILITY	A - AGGRESSION
F - INFREQUENCY	DE - DRIVING EXPRESSIVENESS
SE - SELF ESTEEM	DD - DANGEROUS DRIVING
D - DEPRESSION	

IF A BOX MARKED WITH AN X IS CHECKED BY A SUBJECT, HIS SCORE FOR THAT SCALE IS INCREMENTED BY ONE.

		TRUE	FALSE	
1.	If I had a cold, it would not bother me to mix with other people.	T ☐	F ☒	R
2.	To me, crossing the ocean in a sailboat would be a wonderful experience.	T ☐	F ☒	HA
3.	At times, I have a strong urge to do something harmful or shocking.	T ☒	F ☐	DA
4.	Often I stop in the middle of one activity in order to start something else.	T ☒	F ☐	IM
5.	I am quite able to make correct decisions on difficult questions.	T ☒	F ☐	SD
6.	If I were called for jury duty, I would serve without hesitation no matter how inconvenient it might be for me.	T ☒	F ☐	R
7.	I find driving a form of relaxation which I use to relieve my tension.	T ☒	F ☐	DE
8.	My present situation is hopeless.	T ☒	F ☐	D
9.	I have never bought anything in a store.	T ☒	F ☐	F
10.	On the whole, I am satisfied with myself.	T ☒	F ☐	SE
11.	I contribute regularly to charity.	T ☒	F ☐	R
12.	I don't ever go walking in places where there might be poisonous snakes.	T ☒	F ☐	HA
13.	My conduct is largely controlled by the customs of those about me.	T ☐	F ☒	DA
14.	I rarely feel disappointed.	T ☐	F ☒	D
15.	I am a cautious driver.	T ☐	F ☒	DD
16.	I am careful to consider all sides of an issue before taking action.	T ☐	F ☒	IM
17.	I am never able to do things as well as I should.	T ☐	F ☒	SD
18.	When I bump into a piece of furniture, I don't usually get angry.	T ☐	F ☒	A

		TRUE	FALSE
19.	The only purpose of a car is to provide transportation from one place to another.	T ☐	F ☒ DE
20.	I am free of aches and pains.	T ☐	F ☒ D
21.	I could easily count from one to twenty-five.	T ☐	F ☒ F
22.	At times I think I am no good at all.	T ☐	F ☒ SE
23.	I am too busy to find time to help needy people.	T ☐	F ☒ R
24.	I think it would be fun to be a test pilot for experimental jet planes.	T ☐	F ☒ HA
25.	My parents often objected to the kind of people I went around with.	T ☒	F ☐ DA
26.	Defensive driving is not necessary because I shouldn't have to compensate for other people's errors.	T ☒	F ☐ DD
27.	I often say the first thing that comes into my head.	T ☒	F ☐ IM
28.	My life is full of interesting activities.	T ☒	F ☐ SD
29.	I think that certain people deserve to be "put in their places".	T ☒	F ☐ A
30.	I would rather have a 400 horsepower engine in an old car than a low powered engine in a new car.	T ☒	F ☐ BE
31.	My future is cheery.	T ☐	F ☒ D
32.	I can run a mile in less than four minutes.	T ☒	F ☐ F
33.	I feel I have a number of good qualities.	T ☒	F ☐ SE
34.	If I accidentally scratched a parked car, I would try to find the owner to pay for the repairs.	T ☒	F ☐ R
35.	I try to get out of jobs that would require using dangerous tools or machinery.	T ☒	F ☐ HA
36.	It is wrong to break the law.	T ☐	F ☒ DA
37.	I drive aggressively.	T ☒	F ☐ DD

		TRUE	FALSE	
38.	I am pretty cautious.	T ☐	F ☒	IM
39.	I believe people tell lies any time it is to their advantage.	T ☐	F ☒	SD
40.	I seldom feel like hitting anyone.	T ☐	F ☒	A
41.	I do not find it difficult to keep to the speed limit even when there is an open road ahead and the speed limit is 50 km/hr.	T ☐	F ☒	DD
42.	I live a gloomy and boring life.	T ☒	F ☐	D
43.	I have never talked to anyone by telephone.	T ☒	F ☐	F
44.	I am able to do things as well as most other people.	T ☒	F ☐	SE
45.	Sometimes it is too troublesome to do exactly what I promised I would do.	T ☐	F ☒	R
46.	I like to live dangerously.	T ☐	F ☒	HA
47.	It does not matter to me if I have a criminal record.	T ☒	F ☐	DA
48.	I am careful to come to a full complete stop at stop signs.	T ☐	F ☒	DD
49.	When I go to the store, I often come home with things I had not intended to buy.	T ☒	F ☐	IM
50.	If someone gave me too much change I would tell him.	T ☒	F ☐	SD
51.	When I am irritated, I let it be known.	T ☒	F ☐	A
52.	When I am upset, driving helps soothe my nerves.	T ☒	F ☐	DE
53.	I enjoy just about everything I do.	T ☐	F ☒	D
54.	I usually wear something warm when I go outside on a very cold day.	T ☐	F ☒	F
55.	I feel I do not have much to be proud of.	T ☐	F ☒	SE
56.	Under no circumstances would I give incorrect testimony or evidence in court.	T ☒	F ☐	R
57.	I would never want to be a forest-fire fighter.	T ☒	F ☐	HA
58.	The majority of my friends have not been arrested for a criminal offense.	T ☐	F ☒	DA

		TRUE	FALSE	
59.	Some of my friends have told me that I am <u>not</u> a very good driver.	T ☒	F ☐	DD
60.	Rarely, if ever, do I do anything reckless.	T ☐	F ☒	IM
61.	I would be willing to do something a little unfair to get something that was important to me.	T ☐	F ☒	SD
62.	I rarely get angry either at myself or at other people.	T ☐	F ☒	A
63.	I do not like to drive in a car when I am angry.	T ☐	F ☒	DE
64.	Others seem to lead happier lives than I do.	T ☒	F ☐	D
65.	I make all my own clothes and shoes.	T ☒	F ☐	F
66.	I certainly feel useless at times.	T ☒	F ☐	SE
67.	I think it would be challenging to try to smuggle a small item into the country.	T ☐	F ☒	R
68.	Parachute jumping is a hobby that appeals to me.	T ☐	F ☒	HA
69.	I live a very satisfying and rewarding life.	T ☐	F ☒	D
70.	I rarely get distracted when I drive.	T ☐	F ☒	DD
71.	Many of my actions seem to be hasty.	T ☒	F ☐	IM
72.	I get along with people at parties quite well.	T ☒	F ☐	SD
73.	Stupidity makes me angry.	T ☒	F ☐	A
74.	I feel powerful when I drive a car.	T ☒	F ☐	DE
75.	Life is extremely dull for me.	T ☒	F ☐	D
76.	I have never brushed or cleaned my teeth.	T ☒	F ☐	F
77.	I feel I am a person of worth, at least on an equal plane with others.	T ☒	F ☐	SE
78.	If the conductor on a train forgot to take my ticket, I would tell him.	T ☒	F ☐	R
79.	I would not explore an old deserted house on a dark night.	T ☒	F ☐	HA
80.	I drive more aggressively when I have been drinking.	T ☒	F ☐	DE

		TRUE	FALSE
81.	Emotion seldom causes me to act without thinking.	T ☐	F ☒ IM
82.	I did many bad things as a child.	T ☐	F ☒ SD
83.	I would never start a fight with someone.	T ☐	F ☒ A
84.	A car is not a status symbol.	T ☐	F ☒ DE
85.	Something interesting happens to me almost every day.	T ☐	F ☒ D
86.	Things with sugar in them usually taste sweet to me.	T ☐	F ☒ F
87.	I wish I could have more.	T ☐	F ☒ SE
88.	If people choose to drink and drive, it is their own business.	T ☐	F ☒ R
89.	If I discovered a cave I would explore it right away, even if I was not sure how risky it was.	T ☐	F ☒ HA
90.	I have often broken things because of carelessness.	T ☒	F ☐ IM
91.	I am glad I grew up the way I did.	T ☒	F ☐ SD
92.	I have been known to fly into a rage if things didn't go as I had planned.	T ☒	F ☐ A
93.	I enjoy driving after I have had several drinks.	T ☒	F ☐ DE
94.	I often have trouble sleeping because I feel so sad.	T ☒	F ☐ D
95.	Sometimes I see cars near my home.	T ☐	F ☒ F
96.	All in all, I am inclined to feel I am a failure.	T ☐	F ☒ SE
97.	I am very careful not to litter public places.	T ☒	F ☐ R
98.	I have no strong desire to drive a motorcycle.	T ☒	F ☐ HA
99.	I am greatly concerned with what people think about me.	T ☒	F ☐ D
100.	I have a reserved and cautious attitude toward life.	T ☐	F ☒ IM
101.	I often question whether life is worthwhile.	T ☐	F ☒ SD

		TRUE	FALSE	
102.	If someone does something I don't like, I seldom say anything.	T ☐	F ☒	A
103.	I do not enjoy driving around when I am not going any place in particular.	T ☐	F ☒	DE
104.	I don't think things will ever get any better for me.	T ☒	F ☐	D
105.	I have never had any hair on my head.	T ☒	F ☐	F
106.	I take a positive attitude towards myself.	T ☒	F ☐	SE
107.	If I could get away with it, I would not pay my taxes.	T ☐	F ☒	R
108.	I would enjoy learning to walk on a tightrope.	T ☐	F ☒	HA
109.	Most people feel that I act impulsively.	T ☒	F ☐	IM
110.	I am always prepared to do what is expected of me.	T ☒	F ☐	SD
111.	I often make people angry by teasing them.	T ☒	F ☐	A
112.	I frequently drive with my car radio on very loud.	T ☒	F ☐	DE
113.	I believe that life is worth living.	T ☐	F ☒	D
114.	I have travelled away from my home town.	T ☐	F ☒	F
115.	I would not even be tempted to collect unemployment insurance when I could be working.	T ☒	F ☐	R
116.	I avoid some hobbies and sports because of their dangerous nature.	T ☒	F ☐	HA
117.	My thinking is usually careful and purposeful.	T ☐	F ☒	IM
118.	My daily life includes many activities I dislike.	T ☐	F ☒	SD
119.	I avoid criticizing others under any circumstances.	T ☐	F ☒	A
120.	I do not like to drive a car when I am depressed.	T ☐	F ☒	DE
121.	I feel depressed most of the time.	T ☒	F ☐	D
122.	I have never ridden in an automobile.	T ☒	F ☐	F

		TRUE	FALSE	
123.	I see no need for belonging to service clubs or community organizations.	T [ ]	F [X]	R
124.	Exploring dangerous sections of a city sounds like fun to me.	T [ ]	F [X]	HA
125.	Sometimes I get several projects started at once because I don't think ahead.	T [X]	F [ ]	IM
126.	I am one of the lucky people who could talk with my parents about my problems.	T [X]	F [ ]	SD
127.	Sometimes I feel like smashing things.	T [X]	F [ ]	A
128.	Most of my friends drink and drive.	T [X]	F [ ]	DA
129.	I am quite content with my life as it is now.	T [ ]	F [X]	D
130.	I have never felt sad.	T [X]	F [ ]	F
131.	Everyone should spend a part of his leisure time working on community projects.	T [X]	F [ ]	R
132.	I don't like to go near trucks carrying explosive materials.	T [X]	F [ ]	HA
133.	I am not one of those people who blurt out things without thinking.	T [ ]	F [X]	IM
134.	I am careful to plan for my distant goals.	T [X]	F [ ]	SD
135.	If someone hurts me, I just try to forget about it.	T [ ]	F [X]	A
136.	If I have been drinking a lot, I usually make arrangements to have a friend drive me home afterwards.	T [ ]	F [X]	DA
137.	I dislike doing anything new.	T [X]	F [ ]	D
138.	Sometimes I feel hungry or thirsty.	T [ ]	F [X]	F
139.	I collect souvenirs such as towels or glasses from hotels and restaurants I visit.	T [ ]	F [X]	R
140.	I think I would enjoy mountain climbing.	T [ ]	F [X]	HA
141.	I find that thinking things over very carefully often destroys half the fun of doing them.	T [X]	F [ ]	IM
142.	I find it very difficult to concentrate.	T [ ]	F [X]	SD
143.	I get a kick out of seeing someone I dislike appear foolish in front of others.	T [X]	F [ ]	A

		TRUE	FALSE	
144.	I used to associate only with people who drink.	T ☒	F ☐	DA
145.	I am usually a happy person.	T ☐	F ☒	D
146.	I have attended school at some time during my life.	T ☐	F ☒	F
147.	I think that the penalty for not paying traffic fines should be severe.	T ☒	F ☐	R
148.	I get worried even watching a trapeze artist so I would never actually try it myself.	T ☒	F ☐	HA
149.	Recent events have made me feel downhearted and miserable.	T ☒	F ☐	D
150.	I generally rely on careful reasoning in making up my mind.	T ☐	F ☒	IM
151.	I rarely swear.	T ☐	F ☒	A
152.	I do not argue with police.	T ☐	F ☒	DA
153.	Sometimes the only way to get waited on in a store is to push through to the head of the line.	T ☐	F ☒	R
154.	I do not usually drive over the speed limit.	T ☐	F ☒	DD
155.	Many things make me feel uneasy.	T ☐	F ☒	SD
156.	I would never hunt or fish out of season.	T ☒	F ☐	R
157.	I believe that I shall have my share of good luck.	T ☐	F ☒	D
158.	I go out of my way to prevent anyone from getting the best of me.	T ☒	F ☐	A
159.	I try to get at least some sleep every night.	T ☐	F ☒	F
160.	I see nothing wrong with having a traffic ticket "fixed".	T ☐	F ☒	R

Instructions for Part II

Some questions will ask you to write in your answers in the boxes provided.

Example

A. How old are you? ☐☐ years

If you are 35 years old, the answer should be entered like this.

3 5 years

In some instances you will be asked to circle the appropriate number.

Example

B. I am a male.

true..... (1)

false..... 2

LIFE EVENTS SCALE

1. The list of items below ask you to indicate your experiences and reactions to major life events. First, go through the list and put a check mark ☑ in the box that indicates whether an event happened to you in the past 12 months.

   If an event did occur, indicate how desireable you found the event to be personally, (i.e., circle the appropriate number)

	DID NOT OCCUR IN PAST YEAR	DID OCCUR IN PAST YEAR	DESIREABLE	SOMEWHAT UNDESIREABLE	VERY UNDESIREABLE
1. got married	☐	☐ IF CHECKED →	1	2	3
2. got engaged	☐	☐ →	1	2	3
3. been divorced, separated, or had an engagement broken	☐	☐ →	1	2	3
4. wife had a baby	☐	☐ →	1	2	3
5. had a son or daughter leave home	☐	☐ →	1	2	3
6. started working	☐	☐ →	1	2	3
7. lost a job(i.e. fired, laid off or quit)	☐	☐ →	1	2	3
8. changed to a different line of work	☐	☐ →	1	2	3
9. retired	☐	☐ →	1	2	3
10. been unemployed	☐	☐ →	1	2	3
11. had difficulties with your boss	☐	☐ →	1	2	3
12. had business or other work related difficulties	☐	☐ →	1	2	3
13. changed jobs for a worse one	☐	☐ →	1	2	3
14. was demoted	☐	☐ →	1	2	3

	DID NOT OCCUR IN PAST YEAR	DID OCCUR IN PAST YEAR	DESIRABLE	PERSONAL UNDESIRABLE	VERY UNDESIRABLE
15. had a significant success at work	☐	☐ IF CHECKED	1	2	3
16. made a major purchase on an installment plan.....	☐	☐	1	2	3
17. had an item bought on an installment plan repossessed.....	☐	☐	1	2	3
18. had a period of financial difficulty other than listed in #17	☐	☐	1	2	3
19. had a financial improvement	☐	☐	1	2	3
20. moved to a different house, apartment or community.....	☐	☐	1	2	3
21. remodeled a house	☐	☐	1	2	3
22. death of close family member	☐	☐	1	2	3
23. death of a spouse	☐	☐	1	2	3
24. death of a close friend.....	☐	☐	1	2	3
25. family member experienced serious personal injury or illness.....	☐	☐	1	2	3
26. experienced serious personal injury or illness other than your treatment alcohol	☐	☐	1	2	3
27. physical health improved	☐	☐	1	2	3

	DID NOT OCCUR IN PAST YEAR	DID OCCUR IN PAST YEAR	DESIREABLE	SOMEWHAT UNDESIREABLE	VERY UNDESIREABLE
28. had trouble with your in-laws.....	☐	☐ IF CHECKED →	1	2	3
29. relations with parents changed for the worse.....	☐	☐ →	1	2	3
30. relations with the person closest to you changed for the worse.....	☐	☐ →	1	2	3
31. stopped formal schooling	☐	☐ →	1	2	3
32. started formal schooling	☐	☐ →	1	2	3
33. failed school or a training program ...	☐	☐ →	1	2	3
34. graduated from school or a training program	☐	☐ →	1	2	3
35. conflict with the law.....	☐	☐ →	1	2	3
36. been assaulted	☐	☐ →	1	2	3
37. been robbed	☐	☐ →	1	2	3
38. took a vacation	☐	☐ →	1	2	3
39. any other events (please specify) _____ _____	☐	☐ →	1	2	3

CODING SCHEME

1. EVENT DID NOT OCCUR
2. EVENT DID OCCUR AND DESCRIBED AS DESIREABLE
3. EVENT DID OCCUR AND DESCRIBED AS SOMEWHAT UNDESIREABLE
4. EVENT DID OCCUR AND DESCRIBED AS VERY UNDESIREABLE

REACTIONS TO DRINKING SCALE

2. *The list below describes how some people react to drinking.*
Please circle the number that best describes how drinking makes you feel.

In general, when you drink, does drinking...

	USUALLY	SOME-TIMES	RARELY OR NEVER
a) relieve your depression?.....	1	2	3
b) make you feel more adequate?.....	1	2	3
c) make you more sociable?.....	1	2	3
d) make you feel less lonely?.....	1	2	3
e) make you feel more in control of situations?.....	1	2	3
f) reduce your troubles or worries?.....	1	2	3
g) build up your self confidence?.....	1	2	3
h) make you feel more manly?.....	1	2	3
i) relieve your anxiety?.....	1	2	3
j) make you feel more powerful?.....	1	2	3
k) make it easier to talk to other people?...	1	2	3

*THE CODING IS REVERSED FOR ALL ITEMS OF THIS SCALE

3. What is your usual occupation? _____

4. Are you an .....

CIRCLE ONE

inpatient.....1

outpatient.....2

5. In the past 5 years please list all criminal offences for which you have been convicted.

_____

_____

_____

_____

6. What is your age?..... ☐☐ years old

Questions 7 through 9 and 11 refer to your experiences for one year prior to your admission to St. Thomas.

7.(a) How many days in an average week did you drink?..... ☐ days

7.(b) How many days in an average week did you drink.....

a) ...at home ☐ days

b) ...at a tavern or lounge ☐ days

c) ...at a friend's home ☐ days

This chart may assist you in calculating the number of drinks per day you had. Please provide your best estimates.

ONE DRINK = 1 1/2 oz. of spirits (i.e., rye, rum, vodka, etc.)
=one 12 oz. beer
= 5 oz. of wine

Beverage	Usual Bottle Size	Drinks per bottle
table wine	26.4 oz = (750 ml)	5.3
	35.2 oz = (1000 ml)	7.0
fortified wine	26.4 oz = (750 ml)	7.5
spirits	12.0 oz = (350 ml)	8.0
	25.0 oz = (710 ml)	16.6
	40.0 oz = (1135 ml)	26.6

8.(a) On a typical drinking occasion, how many drinks did you usually have? (One drink = 1 1/2 oz. of spirits (i.e. rye, rum, vodka, etc.) = one 12 oz. beer = 5 oz. of wine) .... ☐☐ drinks

(b) When you drank, over how many hours did you usually drink?..... ☐☐ hours

(c) On how many days in an average week did you drive after a typical drinking occasion?..... ☐ days

(d) On how many days in an average month did you drive after a typical drinking occasion?..... ☐☐ days

(e) In the past year, what is the most number of drinks you have had in a day?..... ☐☐ drinks

9.(a) On how many days in an average month did you drive a car after drinking at least 3 drinks within one hour, (or 4 drinks in two hours, 5 drinks in three hours, 6 drinks in four hours, etc.)?..... ☐☐ days

IF ZERO (0) ➔ GO TO QUESTION 10

(b) How far (number of miles or kilometers) would you usually drive in this condition?..... ☐☐☐ miles
☐☐☐ or km.

DANGEROUS STYLES OF DRINKING AND DRIVING

10(a) How did you drive on occasions after you had consumed at least 3 drinks in an hour (or 4 drinks in two hours, or 5 drinks in three hours or 6 drinks in four hours, etc.)?

If you have never driven in this condition check here, ☐ AND → GO TO QUESTION

		MOST OF THE TIME	SOME OF THE TIME	NEVER OR HARDLY EVER
R	a) I drove faster than the speed limit.....	1	2	3
	b) I drove at the speed limit or slower.....	1	2	3
R	c) I would take a risk while driving for the thrill of it	1	2	3
	d) I avoided heavily travelled streets.....	1	2	3
R	e) I used my horn a lot	1	2	3
	f) I tried to pay more attention by looking in rear mirror and all around.....	1	2	3
R	g) I would break a traffic law if it meant getting out of a difficult situation.....	1	2	3
	h) I drove carefully	1	2	3
R	i) I cut in and out of traffic.....	1	2	3
	j) I watched out for police when driving.....	1	2	3
R	k) I had difficulty staying in my lane.....	1	2	3
	l) I tried to obey all traffic laws.....	1	2	3
R	m) I drove recklessly.....	1	2	3
	n) I would brake rather than accelerate to get out of a difficult situation.....	1	2	3
R	o) I would take corners as fast as possible....	1	2	3
	p) I found it easy to concentrate on my driving	1	2	3
R	q) anything else (please specify) _____	1	2	3

10(b) Compared to when you had nothing to drink how did you usually drive after you had consumed at least 3 drinks in an hour (or 4 drinks in two hours or 5 drinks in three hours, etc.)

		MOST OF THE TIME	SOME OF THE TIME	NEVER OR HARDLY EVER
R	(a) faster.....	1	2	3
	(b) slower.....	1	2	3

R - CODING IS REVERSED

11.(a) On how many days in an average month did you make alternative transportation arrangements so that you would not have to drive a car in this condition?

IF you made no alternative arrangements, answer 0 and → GO TO QUESTION 12 BELOW.

☐☐ days

(b) What kind of arrangements did you make?

_____

_____

(c) Circle the number that best describes how important the following reasons were in deciding not to drive.

	VERY IMPORTANT	SOMEWHAT IMPORTANT	NOT AT ALL IMPORTANT
a) the likelihood of getting caught was too great.....	1	2	3
b) the severity of the penalty if caught was too high.....	1	2	3
c) it was too dangerous.....	1	2	3
d) someone convinced me not to drive in such a condition.....	1	2	3
e) it was morally wrong.....	1	2	3
f) any other reasons (please specify) _____.....	1	2	3

12.(a) On a scale of 1 to 10, 1 being a very poor driver, and 10 being an excellent driver, how would you rate your driving ability?..... ☐☐

(b) How many years have you had a driver's license?..... ☐☐ years

(c) During the last year, approximately how many miles or kilometers did you drive?

☐☐☐☐☐ miles
or
☐☐☐☐☐ km

(d) Are you required to drive for work?

CIRCLE ONE

yes..... 1

no..... 2 → GO ON TO QUESTION 12F

(e) If yes, approximately how many miles or kilometers did you drive for work per year?

☐☐☐☐ miles
or
☐☐☐☐ km

(f) Do you own a car?

CIRCLE ONE

yes..... 1

no..... 2

(g) Whose car do you usually drive?

CIRCLE ONE

my own..... 1

spouse's, relative's..... 2

employer..... 3

friend's..... 4

other (specify) _____ 5

(h) What kind of car do you usually drive?

Make _____

Year _____

13.(a) Have you been involved in a traffic accident in the past 5 years?

CIRCLE ONE

yes.....1

no.....2 → GO ON TO QUESTION 14

(b) Please describe how you were involved in your most recent traffic accident?

_____

_____

(c) Were you judged responsible for this accident?

CIRCLE ONE

yes.....1

no.....2

(d) For how many hours were you drinking prior to the accident?

If you don't know, Check here ☐

☐☐ hours

IF YOU WEREN'T DRINKING ANSWER ZERO, AND → GO ON TO QUESTION 14.

(e) How many drinks of alcohol did you consume during this same period?

If you don't know, Check here ☐

☐☐ drinks

14.(a) Were you ever charged with driving while impaired, but had this charge dropped, in exchange for either a more severe or reduced charge.

CIRCLE ONE

yes..... 1

no..... 2 → GO ON TO QUESTION 15

(b) If yes, what were you eventually charged with?

_____

15. (a) Have you ever been stopped by the police when you were driving while impaired but were not asked to take the breathalyser test?

CIRCLE ONE

yes..... 1

no ..... 2 → GO ON TO QUESTION 16

(b) In the situation described above, why do you think the police chose not to give you the breathalyser test?

_____

_____

_____

16. (a) In the last 10 years, how many times have you been arrested (not necessarily convicted) for driving while impaired, refusal to take a breath test or any other drinking and driving related charges?

☐☐ times

IF ZERO → GO ON TO QUESTION 17

(b) When was your most recent arrest?

☐☐ month ☐☐ year

(c) For your most recent arrest for driving while impaired, why do you think the police noticed your driving (e.g., speeding, in a traffic accident, went through a red light, stopped in a spot check, etc.)?

_____

_____

_____

(d) Before your most recent arrest, approximately how many days in an average month did you drive a car after drinking at least 3 drinks within one hour, (or 4 drinks in two hours, 5 drinks in three hours, 6 drinks in four hours, etc.)?

☐☐ days

(e) Compared to before your most recent arrest, how did you drink and drive (ie. an amount listed in question 16.d) after your arrest?

If you did not drive in this condition after your arrest check here ☐ → GO ON TO NEXT QUESTION

	CIRCLE NUMBERS	
took fewer risks.....	1 yes	2 no
slower.....	1 yes	2 no
more carefully.....	1 yes	2 no
less frequently.....	1 yes	2 no

17. Thank you for answering these questions. If you have anything else you would like to tell us about the problems that brought you to St. Thomas for treatment, please use this space.

_____

_____

_____

_____

_____

BACKGROUND INFORMATION

1. What is your marital status? (Circle one)

never married	1
married	2
remarried	3
common-law	4
widowed	5
separated	6
divorced	7

2. With whom are you currently living? (Circle one)

children only	1
spouse or spouse and children	2
boyfriend/girlfriend	3
parents	4
relatives	5
friends	6
halfway house	7
alone	8

3. What is the highest level of education you have completed? (Circle one)

elementary school or lower	1
some high school	2
high school completed	3
technical education	4
apprenticeship	5
community college completed	6
some university	7
university completed	8
graduate or professional degree	9

4.. For how many years have you been in your current job (Write "0" for less than 1 year)..... (# years) ☐☐

Note: *The following questions pertain to the 12 months prior to admission to St. Thomas.*

5. During the past 12 months, how many jobs did you have? (e.g., If you have been with the same company, record "1") ☐☐

6. How many months were you employed in the past year? (# months) ☐☐

7. What was your average MONTHLY take-home salary in the past year? ☐☐☐☐

8. Have you ever made an attempt at suicide? (Circle one)

no	1
yes, once	2
yes, more than once	3

9. What is your weight in pounds? (without clothes)..... ☐☐☐

10. In the past 6 months how often have you had contact with (including telephone or mail):

Answers: (*Please fill in each box*)

1 none
2 less than monthly
3 monthly
4 weekly
5 daily or almost daily
6 not applicable (e.g., parent(s) deceased, divorced, etc.)

Parents	☐
Spouse	☐
Children	☐
Other relatives	☐

11. We need to establish the amount of alcohol you have been drinking. Think about the last six months of drinking. On a typical drinking day, which beverage (or combination of beverages) do you usually drink? Please record the amount(s) below.

Alcohol Conversions:	
Wine:	Liquor:
750 ml = 26 oz.	mickey = 12 oz.
1 litre = 1000 ml = 39 oz.	710 ml = 25 oz.
(1 L) 1500 ml = 52.5 oz.	1.14 litres = 40 oz.

bottles of 12 ounces of beer ..... [ ][ ]

number of ounces of wine ..... [ ][ ]

number of ounces of liquor ..... [ ][ ]

12. In the last year, prior to coming in for treatment, what is the longest period of time you have gone without drinking? (Do not include time in hospital).....(# weeks) [ ][ ]

13. Before you contacted St. Thomas for treatment, how many days in a 30 day month did you drink? .....(# days) [ ][ ]

14. Before you contacted St. Thomas for treatment, how many days in a 30 day month were you free of alcohol? .....(# days) [ ][ ]

Note: *#13 & #14 should add up to 30 days.*

HEALTH QUESTIONNAIRE

|_|_|_|_|_|

DATE |_|_| |_|_| |_|_|
DAY MONTH YEAR

MARITAL AND FAMILY INFORMATION

1. What is your marital status?

1	Never Married	5	Widowed
2	Married	6	Separated
3	Remarried	7	Divorced
4	Common-Law		

.....|_|

2. How many children have you had? .....|_|_|

3. With whom are you currently living?

1	Children Only	5	Relatives
2	Spouse or Spouse & Children	6	Friends
3	Boyfriend/Girlfriend	7	Halfway House
4	Parents	8	Alone

.....|_|

4. In the past 6 month how often have you had contact with your parents (including telephone or mail contact)?

1	No Contact	4	Weekly
2	Less Than Monthly	5	Daily or Almost Daily
3	Monthly	6	Not Applicable (e.g., parents deceased)

.....|_|

5. In the past 6 months how often have you had contact with your spouse (including telephone or mail contact)?

1	No Contact	4	Weekly
2	Less Than Monthly	5	Daily or Almost Daily
3	Monthly	6	Not Applicable (e.g., divorced)

....|_|

6. In the past 6 months how often have you had contact with your children (including telephone or mail contact)?

1	No Contact	4	Weekly
2	Less Than Monthly	5	Daily or Almost Daily
3	Monthly	6	Not Applicable (e.g, no children)

..|_|

7. In the past 6 months how often have you had contact with other relatives (including telephone or mail contact)?

1	No Contact	4	Weekly
2	Less Than Monthly	5	Daily or Almost Daily
3	Monthly	6	Not Applicable (No Relatives)

.....|_|

8. What is your present accommodation?

1	House	5	Shelter/Hotel/Halfway House
2	Condominium	6	Institution (Jail/Hospital)
3	Apartment	7	No Fixed Address
4	Room	8	Other ..... ⌊__⌋

9. What is your racial background?

1	Caucasian (White)	4	North American Native
2	Black		(Inuit/Metis, etc.)
3	Oriental	5	Other ..... ⌊__⌋

10. Who referred you to The Donwood?

1	Self	6	Community Agency
2	Physician	7	Employee Assistance Program
3	Family/Relative	8	Courts
4	Friend	9	Other
5	Employer		..... ⌊__⌋

11. What is the HIGHEST level of education you have completed?

1	Elementary School or Lower	6	Community College
2	Some High School	7	Some University
3	High School Completed	8	University Completed
4	Technical Education	9	Graduate or Professional Degree
5	Apprenticeship		..... ⌊__⌋

ALCOHOL USE

We need to establish the amount of alcohol you have been drinking. Think about the last six months of drinking. On a typical drinking day, which type(s) of alcohol beverage(s) did you usually drink? Please record the amount of each type of alcohol beverage consumed on a typical drinking day.

2. ⌊__⌋⌊__⌋ Bottles of Beer

3. ⌊__⌋⌊__⌋ Ounces of Table Wine

4. ⌊__⌋⌊__⌋ Ounces of Liquor

Please indicate which type of beverage you consumed on a typical drinking day.

5. Beer

1	Domestic	3	Both
2	Imported		..... ⌊__⌋

6. Wine

1 Domestic 3 Both
2 Imported ..... ⌊_⌋

7. Liquor

1 Domestic 3 Both
2 Imported ..... ⌊_⌋

8. In the last year, prior to coming to The Donwood for treatment, what is the longest number of WEEKS you have gone without drinking? (Do not include time in the hospital or jail.)
Number of Weeks ..... ⌊_⌋⌊_⌋

9. Before you contacted The Donwood for treatment, how many days per month were you drinking? Number of Days ..... ⌊_⌋⌊_⌋

10. Before you contacted The Donwood for treatment, how many days per month were you free of alcohol? Number of Days ..... ⌊_⌋⌊_⌋

NOTE: Your answers to Questions #9 and #10 should add to 30 days.

11. For how many years have you found that alcohol was causing problems in your life? Number of Years ..... ⌊_⌋⌊_⌋

DRUG USE

Drug use includes prescription medications such as sleeping pills, painkillers, tranquilizers or medications for depression or anxiety. It also includes over-the-counter drugs such as 222's or any codeine containing medication, Bromo Seltzer and any street drugs such as marijuana, hashish, cocaine, etc.

12. Before you contacted Donwood for treatment, how many days per month were you using drugs? Number of Days ..... ⌊_⌋⌊_⌋

13. For how many years have you found that drugs were causing problems in your life? Number of Years ..... ⌊_⌋⌊_⌋

OFFICE USE ONLY

14. Alcohol Use Questionnaire ⌊_⌋⌊_⌋

15. Drug Use Questionnaire ⌊_⌋⌊_⌋

TOBACCO USE

16. Have you ever used any tobacco product (i.e., cigarettes, cigars, pipes, chewing tobacco) on a regular basis?

1 Yes 3 Yes; Ex-Smoker
2 No ..... ☐

NOTE: If you do NOT smoke, skip to the next section, Employment.

If you do smoke, what is your average daily use of:

17. Cigarettes Number of Cigarettes Per Day..... ☐☐
18. Pipes of Tobacco Number of Pipes Per Day ..... ☐☐
19. Cigars Number of Cigars Per Day ..... ☐☐
20. For how many years have you been smoking? No. of Years .. ☐☐

EMPLOYMENT INFORMATION

2. What is your present employment status? Are you:

1 Unemployed
2 Part-time Job
3 Employed Non-Shift
4 Employed, Shift
5 Self-Employed
6 Homemaker
7 Student Full-Time
8 Retired
9 Not in the Labour Force (e.g., unable to work)

..... ☐

3. What is your occupation? _____ ☐☐
(If unemployed, indicate your usual occupation.) LEAVE BOX BLANK

Can you describe the type of business/company with which you are associated? _____

NOTE: IF YOU HAVE NOT BEEN EMPLOYED IN ANY CAPACITY DURING THE PAST 12 MONTHS, SKIP TO QUESTION 14.

4. For how many years have you been in your current job? (Write "0" for less than one year.) Number of Years .... ☐☐

NOTE: THE FOLLOWING QUESTIONS PERTAIN TO THE 12 MONTHS PRIOR TO ADMISSION TO THE DONWOOD.

5. During the past 12 months, how many jobs did you have? (e.g., if you have been with the same company for a year or more, record "1") Number of Jobs .... ☐☐

6. How many months were you employed in the past year? ..... ☐☐

7. On the average, how many days a month were you employed in the past year? (e.g., 5 days per week = 20 days per month) .. |__|__|

8. What was your average MONTHLY take-home salary in the past year? Number of Whole Dollars ..... |__|__|__|__|__|

9. How many days were you absent from work in the past year? (Do not include vacation time.) ..... |__|__|__|

10. For how many months were you UNEMPLOYED in the past year? (Record "0" if not applicable) Number of Months ..... |__|__|

11. Have you ever been in trouble at work because of drinking?

1 Never
2 Yes, in The Last Six Months
3 Yes, in the Last Year
4 Yes, Over a Year Ago
5 Does Not Apply
..... |__|

12. Do you drink on the job (excluding lunch hours)?

1 Never
2 Yes, in the Last Six Months
3 Yes, in the Last Year
4 Yes, Over a Year Ago
5 Does Not Apply
..... |__|

13. Have you ever lost a job because of drinking?

1 No
2 Yes
7 Does not apply
..... |__|

What were your sources of income other than from employment over the past year?

14-15.	Commission	No. of Months	|__|__|	$/Month	|__|__|__|__|
16-17.	Unemployment Insurance	No. of Months	|__|__|	$/Month	|__|__|__|__|
18-19.	Welfare	No. of Months	|__|__|	$/Month	|__|__|__|__|
20-21.	Worker's Compensation	No. of Months	|__|__|	$/Month	|__|__|__|__|
22-23.	Other Income	No. of Months	|__|__|	$/Month	|__|__|__|__|

MEDICAL INFORMATION

2. How would you rate your present physical condition?

1 Poor
2 Fair
3 Good
4 Excellent ..... |__|

3. What is your weight in pounds? (Without clothes) ..... |__|__|__|

In the 12 months before coming to The Donwood, how many DAYS were you in hospital for:

(Record "0" if no days or not applicable.)

4. Medical/Surgical Treatment? ..... |__|__|__|

5. Psychiatric Treatment? ..... |__|__|__|

6. Only Alcohol Treatment? ..... |__|__|__|

7. Only Drug Treatment? ..... |__|__|__|

8. Alcohol and Drug Treatment? ..... |__|__|__|

9. During the last 12 months prior coming into The Donwood, how many days did you spend in a detox centre (not located in a hospital)?
Number of Days ..... |__|__|__|

During the last 12 months prior to coming into The Donwood, how many times did you visit an OUT-PATIENT clinic (not the Emergency Department) for:

(Record "0" if no visits or not applicable.)

10. Medical/Surgical Treatment? ..... |__|__|__|

11. Psychiatric Treatment? ..... |__|__|__|

12. Alcohol Treatment? ..... |__|__|__|

13. Drug Treatment? ..... |__|__|__|

14. Alcohol and Drug Treatment? ..... |__|__|__|

In the past 12 months prior to coming into The Donwood, how many times did you visit:

(Record "0" if no visits or not applicable and do not include time in hospital or at an outpatient clinic.)

15. Family Physician ..... |__|__|
16. Medical Specialist ..... |__|__|
17. Psychiatrist ..... |__|__|
18. Psychologist ..... |__|__|
19. Therapist ..... |__|__|
20. Social Worker ..... |__|__|
21. Dentist ..... |__|__|
22. Other ..... |__|__|

23. In the past 12 months prior to coming to The Donwood, how many visits have you had to an Emergency Department of a hospital?
Number of Visits ..... |__|__|

24. In the past 12 months, have emotional or nervous upsets bothered you?

1 Not At All
2 Very Little
3 To Some Extent
4 A Fair Amount
5 A Great Deal
..... |__|

25. In the past 12 months, prior to coming to The Donwood, did you make an attempt at suicide?

1 No
2 Yes, Once
3 Yes, More Than Once
..... |__|

26. Have you EVER made an attempt at suicide?

1 No
2 Yes, Once
3 Yes, More Than Once
..... |__|

27. In the past 12 months, how frequently have you been depressed, that is, had the "BLUES" or felt down in the dumps?

1 Never
2 Less Than Once a Month
3 A Few Times a Month
4 Once a Week
5 More Than Once a Week
..... |__|

LEGAL BACKGROUND

What is your present legal status?

1. No Legal Charges Pending
2. On Probation
3. On Parole
4. Awaiting Trial ..... ☐

During the past 12 months, prior to coming to The Donwood, have you been ARRESTED for any of the following reasons?

(Record the number of times for each type of offence and record "0" is there have been no arrests.)

3. Driving While Intoxicated (Impaired Driving) ..... ☐
4. Car Accidents ..... ☐
5. Assault ..... ☐
6. Drunk Behaviour (even for a few hours) ..... ☐
7. Crime of Violence or Threat of Violence ..... ☐
8. Robbery ..... ☐
9. Other ..... ☐
10. How many days have you spent in court this past year?
    Number of Days ..... ☐☐☐
11. How many times have you lost your driver's license as a result of police action? ..... ☐

In the past 12 months prior to coming to The Donwood, were you CONVICTED for any of the following offences?

(Record the number of convictions for each type of offence and record "0" if there have been no convictions.)

12. Driving While Intoxicated (Impaired Driving) ..... ☐
13. Car Accidents ..... ☐
14. Assault ..... ☐
15. Drunk Behaviour (even for a few hours) ..... ☐
16. Crime of Violence or Threat of Violence ..... ☐
17. Robbery ..... ☐
18. Other ..... ☐
19. How many days have you spent in jail in the past year?
    Number of Days ..... ☐☐☐

APPENDIX F

Comparisons of Participants and Non-Participants at the Donwood - Table 1 to Table 20

Comparisons of Participants and Non-Participants at St. Thomas Addiction Unit - Table 21 to Table 24

Comparisons of Donwood and St. Thomas Participants Table 25 to Table 30.

THE DONWOOD INSTITUTE

(A) SOCIAL, EDUCATION AND EMPLOYMENT VARIABLES

TABLE 1

Comparison of participants and non-participants for marital status at the Donwood.

MARITAL STATUS	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Never married	32	18.4	15	16.1
Currently married	77	44.3	41	44.1
Common-law	14	8.0	10	10.8
Widowed, separated, divorced	51	29.3	27	29.0
TOTAL	174	100.0	93	100.0

$X^2 = .67$; d.f.=3; p=.879.

TABLE 2

Comparison of participants and non-participants for highest level of education at the Donwood.

HIGHEST LEVEL OF EDUCATION ACHIEVED	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Elementary or lower	6	3.4	13	14.1
Some high school	40	23.0	22	23.9
High school completed	33	19.0	16	17.4
Technical, apprenticeship, community college	42	24.1	15	16.3
Some university	15	8.6	10	10.9
University complete or higher	38	21.8	16	17.4
TOTAL	174	99.9	92	100.0

$X^2 = 12.35$; d.f.=5; p=.0303.

TABLE 3

Comparison of participants and non-participants for socio-economic categories[1] at the Donwood.

	N	MEAN SOCIO-ECONOMIC STATUS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	162	8.9	4.3	-1.25	p=.211
NON-PARTICIPANTS	82	9.7	3.6		

[1] Based on a socio-economic classification scheme developed by Pineo, Porter and McRoberts (1971). It is a 16-point scale with 1 being rated the highest socio-economic status and 16 rated the lowest. This scale, rather than the Blishen, is reported because it is the scale utilized on the health questionnaire developed by the Donwood

TABLE 4

Comparison of participants and non-participants for number of years at current job at the Donwood.

	N	MEAN NUMBER OF YEARS	STANDARD DEVIATION	VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	168	9.0	8.3	.66	p=.508
NON-PARTICIPANTS	93	8.2	10.3		

(B) CONSUMPTION OF ALCOHOL VARIABLES

TABLE 5

Comparison of participants and non-participants for average number of standard drinks consumed on a typical drinking day at the Donwood.

	N	MEAN NUMBER OF DRINKS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	174	16.5	9.7	.75	p= .452
NON-PARTICIPANTS	93	15.5	9.7		

TABLE 6

Comparison of participants and non-participants for average number of days per month drinking for the six month period prior to admission to the Donwood.

	N	MEAN NUMBER OF DRINKING DAYS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	171	23.3	8.5	1.22	p= .223
NON-PARTICIPANTS	92	21.9	9.6		

TABLE 7

Comparison of participants and non-participants for number of years alcohol has been causing problems in your life at the Donwood.

	N	MEAN NUMBER OF YEARS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	170	8.7	7.0	-.26	p=.798
NON-PARTICIPANTS	92	9.0	8.3		

(C) MEDICAL AND PSYCHOLOGICAL VARIABLES

TABLE 8

Comparison of participants and non-participants for number of visits to a family physician for 12 months before admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	170	6.6	14.7	-.13	p= .900
NON-PARTICIPANTS	91	6.8	16.9		

TABLE 9

Comparison of participants and non-participants for number of visits to a medical specialist for 12 months previous to admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	168	.54	1.9	.08	p= .939
NON-PARTICIPANTS	89	.52	1.9		

TABLE 10

Comparison of participants and non-participants for number of visits to a therapist for 12 months before admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	SEPARATE VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	170	1.68	8.8	1.23	p=.220
NON-PARTICIPANTS	91	.65	4.7		

TABLE 11

Comparison of participants and non-participants for number of trips to a social worker for 12 months before admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	SEPARATE VARIANCE ESTIMATE	
				T VALUE	2-TAILED TEST
PARTICIPANTS	170	1.01	3.9	2.1	p=.037
NON-PARTICIPANTS	91	.31	1.4		

TABLE 12

Comparison of participants and non-participants for number of visits to a psychiatrist for 12 months before admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	170	1.1	3.5	-.66	p=.512
NON-PARTICIPANTS	91	1.4	4.4		

TABLE 13

Comparison of participants and non-participants for number of visits to a psychologist for 12 months before admission at the Donwood.

	N	MEAN NUMBER OF VISITS	STANDARD DEVIATION	SEPARATE VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	170	.5	2.9	.63	p=.528
NON-PARTICIPANTS	91	.3	1.6		

TABLE 14

Comparison of participants and non-participants for emotional or nervous upsets in the 12 months prior to admission at the Donwood.

EXTENT OF EMOTIONAL OR NERVOUS UPSETS	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Not at all	24	14.1	18	19.8
Very little	12	7.1	12	13.2
To some extent	44	25.9	28	30.8
A fair amount	32	18.8	20	22.0
A great deal	58	34.1	13	14.3
TOTAL	170	100.0	91	100.1

X^2 =12.98; d.f.=4; p=.0114.

TABLE 15

Comparison of participants and non-participants for self reported frequency of depression at the Donwood.

FREQUENCY OF DEPRESSION	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Never	11	6.5	14	15.4
Less than once a month	33	19.4	21	23.1
A few times a month	46	27.1	26	28.6
Once a week	20	11.8	10	11.0
More than once a week	60	35.3	20	22.0
TOTAL	170	100.1	91	100.1

$X^2 = 8.81$; d.f. = 4; p = .066

(D) LEGAL VARIABLES

TABLE 16

Comparison of participants and non-participants for arrests or convictions for drinking and driving in the 12 months before admission at The Donwood.

NUMBER OF ARRESTS OR CONVICTIONS FOR DRINKING AND DRIVING	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
ZERO ARRESTS OR CONVICTIONS	148	85.1	81	87.1
ONE OR MORE ARRESTS OR CONVICTIONS	26	14.9	12	12.9
TOTAL	174	100.0	93	100.0

X^2 (corrected)= .07; d.f.=1; p=.7867.

TABLE 17

Comparison of participants and non-participants for arrests or convictions for car accidents in the 12 months before admission at The Donwood

NUMBER OF ARRESTS OR CONVICTIONS FOR CAR ACCIDENTS	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
ZERO ARRESTS OR CONVICTIONS	166	95.4	84	90.3
ONE OR MORE ARRESTS OR CONVICTIONS	8	4.6	9	9.7
TOTAL	174	100.0	93	100.0

X^2 (corrected)= 1.84; d.f.=1; p=.1749.

TABLE 18

Comparison of participants and non-participants for arrests or convictions for assault in the 12 months before admission at The Donwood.

NUMBER OF ARRESTS OR CONVICTIONS FOR ASSAULT	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
ZERO ARRESTS OR CONVICTIONS	165	94.8	87	93.5
ONE OR MORE ARRESTS OR CONVICTIONS	9	5.2	6	6.5
TOTAL	174	100.0	93	100.0

X^2 (corrected)= .02; d.f.=1; p=.8780.

TABLE 19

Comparison of participants and non-participants for arrests or convictions for drunk behaviour in the 12 months before admission at The Donwood.

NUMBER OF ARRESTS OR CONVICTIONS FOR DRUNK BEHAVIOR	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
ZERO ARRESTS OR CONVICTIONS	161	92.5	83	89.2
ONE OR MORE ARRESTS OR CONVICTIONS	13	7.5	10	10.8
TOTAL	174	100.0	93	100.0

X^2 (corrected)= .46; d.f.=1; p=.4955.

TABLE 20

Comparison of participants and non-participants at the Donwood for number of times they have had their drivers licence suspended.

NUMBER OF TIMES DRIVERS LICENCE HAS BEEN SUSPENDED	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Zero	97	55.7	46	49.5
One	43	24.7	20	21.5
Two or more	34	19.5	27	29.0
TOTAL	174	99.9	93	100.0

$X^2 = 3.10$; d.f.=2; p=.2121

ST. THOMAS ADDICTION UNIT

TABLE 21

Comparison of participants to non-participants for marital status at the St. Thomas Addiction Unit.

MARITAL STATUS	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
Married, common-law	39	48.7	4	36.4
single, separated, divorced, widowed	41	51.3	7	63.6
TOTAL	80	100.0	11	100.0

X^2 (corrected)= .20; d.f.=1; p=.6531.

TABLE 22

Comparison of participants and non-participants for age at St. Thomas Addiction Unit.

	N	MEAN AGE	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	80	42.3	10.6	.70	p= .485
NON-PARTICIPANTS	11	39.8	12.4		

TABLE 23

Comparison of participants and non-participants for Blishen socio-economic categories at St. Thomas Addiction Unit.

	N	MEAN SOCIO-ECONOMIC STATUS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
PARTICIPANTS	84	32.6	15.5	-.29	p=.772
NON-PARTICIPANTS	11	31.2	13.9		

TABLE 24

Comparison of participants and non-participants for religion at St. Thomas Addiction Unit.

RELIGION	PARTICIPANTS		NON-PARTICIPANTS	
	N	%	N	%
ROMAN CATHOLIC	19	23.8	3	27.3
OTHER	61	76.3	8	72.7
TOTAL	80	100.1	11	100.0

X^2(corrected)=0, d.f.=1, p=1.0

TABLE 25

Comparison of Donwood and St. Thomas participants for marital status.

MARITAL STATUS	DONWOOD		ST. THOMAS	
	N	%	N	%
Never married	32	18.4	14	17.3
Currently married	77	44.3	33	40.7
Common-law	14	8.0	6	7.4
Widowed, separated, divorced	51	29.3	28	346.
TOTAL	174	100.0	81	100.0

$X^2 = .71$; d.f. = 3; p = .8691

TABLE 26

Comparison of Donwood and St. Thomas participants for highest level of education achieved.

HIGHEST LEVEL OF EDUCATION ACHIEVED	DONWOOD		ST. THOMAS	
	N	%	N	%
Elementary or lower	6	3.4	8	9.9
Some high school	40	23.0	29	35.8
High school completed	33	19.0	16	19.8
Technical, apprenticeship, community college	42	24.1	19	23.5
Some university	15	8.6	6	7.4
University complete or higher	38	21.8	3	3.7
TOTAL	174	99.9	81	100.1

$X^2 = 18.94$; d.f.=5; p=.0020

TABLE 27

Comparison of Donwood and St.Thomas participants for Age.

	N	MEAN AGE	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
Donwood	174	41.9	11.7	.51	p= .608
St. Thomas	82	41.2	10.3		

TABLE 28

Comparison of Donwood and St. Thomas participants for average number of drinks per day.

	N	MEAN NUMBER OF DRINKS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
Donwood	170	16.7	9.58	-.12	p=.903
St. Thomas	79	16.9	8.62		

TABLE 29

Comparison of Donwood and St. Thomas participants for Blishen socio-economic codes.

	N	MEAN SOCIO-ECONOMIC STATUS	STANDARD DEVIATION	SEPARATE VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
Donwood	165	47.7	15.1	6.40	p=.000
St. Thomas	74	37.0	10.3		

TABLE 30

Comparison of Donwood and St. Thomas participants for number of years at current job.

	N	MEAN NUMBER OF YEARS	STANDARD DEVIATION	POOLED VARIANCE ESTIMATE	
				T VALUE	2 TAILED TEST
Donwood	168	9.0	8.3	.96	p=.336
St. Thomas	75	7.9	8.7		

APPENDIX C

SUPPLEMENTARY TABLES

Table 1(b). Comparison of single and married people for number of DWI arrests.

Number of DWI Arrests	Presently Single		Presently Married or Common-law	
	N		N	
0 Arrests	53	46.1	67	54.9
1 Arrest	25	21.7	31	25.4
2 or More Arrests	37	32.2	24	19.7
TOTAL	115	100.0	122	100.0

$X^2 = 4.16$; d.f.=2; p=.125

Table 1(a) Group sizes, means, and standard deviations of demographic variables for three groups of DWI arrests.

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
Age	GROUP 0 - ZERO DWI ARRESTS	120	43.6	11.1
	GROUP 1 - ONE DWI ARREST	56	42.5	11.0
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	37.4	10.3
	TOTAL	238	41.7	11.2
	Bartlett's test p= .796			
Socio-economic Status	GROUP 0 - ZERO DWI ARRESTS	111	48.0	14.6
	GROUP 1 - ONE DWI ARREST	53	43.4	14.5
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	39.8	13.6
	TOTAL	221	44.8	14.6
	Bartlett's test p= .851			
Education	GROUP 0 - ZERO DWI ARRESTS	120	4.7	2.6
	GROUP 1 - ONE DWI ARREST	56	4.6	2.5
	GROUP 2 - TWO OR MORE DWI ARRESTS	61	3.8	2.3
	TOTAL	237	4.4	2.5
	Bartlett's test p= .418			

Table 2. Group sizes, means, and standard deviations of drinking related variables for three groups of DWI arrests

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
Most number of drinks in a day (transformed)	GROUP 0 - ZERO DWI ARRESTS	118	3.00	.49
	GROUP 1 - ONE DWI ARREST	53	2.98	.46
	GROUP 2 - TWO OR MORE DWI ARRESTS	59	3.31	.51
	TOTAL	230	3.08	.51
	Bartlett's test p= .727			
Number of drinks on a typical drinking occassion (transformed)	GROUP 0 - ZERO DWI ARRESTS	118	12.8	8.6
	GROUP 1 - ONE DWI ARREST	51	12.4	6.5
	GROUP 2 - TWO OR MORE DWI ARRESTS	60	15.2	7.1
	TOTAL	229	13.3	7.8
	Bartlett's test p= .042			
Average number of days drinking per week	GROUP 0 - ZERO DWI ARRESTS	116	5.94	1.70
	GROUP 1 - ONE DWI ARREST	54	5.63	1.46
	GROUP 2 - TWO OR MORE DWI ARRESTS	61	5.28	1.77
	TOTAL	231	5.69	1.68
	Bartlett's test p= .318			
Reactions to drinking scale	GROUP 0 - ZERO DWI ARRESTS	120	24.6	5.4
	GROUP 1 - ONE DWI ARREST	56	22.7	5.7
	GROUP 2 - TWO OR MORE DWI ARRESTS	60	25.4	6.0
	TOTAL	236	24.3	5.7
	Bartlett's test p= .670			

Table 3. Group sizes, means, and standard deviations of driving related groups of DWI arrests.

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
Average number of days drinking and driving per month (question 8d)	GROUP 0 - ZERO DWI ARRESTS	119	8.8	8.8
	GROUP 1 - ONE DWI ARREST	52	8.4	8.8
	GROUP 2 - TWO OR MORE DWI ARRESTS	60	9.3	9.5
	TOTAL	231	8.6	9.0
	Bartlett's test p= .783			
Dangerous styles of drinking and driving scale (transformed)	GROUP 0 - ZERO DWI ARRESTS	117	2.9	.18
	GROUP 1 - ONE DWI ARREST	55	3.0	.17
	GROUP 2 - TWO OR MORE DWI ARRESTS	59	3.1	.23
	TOTAL	231	3.0	.20
	Bartlett's test p= .040			
Dangerous styles of driving scale	GROUP 0 - ZERO DWI ARRESTS	119	2.3	1.6
	GROUP 1 - ONE DWI ARREST	56	1.7	1.9
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	2.4	2.1
	TOTAL	237	2.2	1.8
	Bartlett's test p= .040			
Driving expressiveness scale	GROUP 0 - ZERO DWI ARRESTS	119	4.3	2.7
	GROUP 1 - ONE DWI ARREST	56	4.4	2.5
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	5.6	3.0
	TOTAL	237	4.7	2.8
	Bartlett's test p= .358			

Table 4. Group sizes, means, and standard deviations of psychosocial variables for three groups of DWI arrests.

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
Responsibility scale	GROUP 0 - ZERO DWI ARRESTS	120	12.2	3.8
	GROUP 1 - ONE DWI ARREST	56	13.8	3.2
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	12.1	4.1
	TOTAL	238	12.6	3.8
	Bartlett's test p= .172			
Disrespect for authority scale	GROUP 0 - ZERO DWI ARRESTS	120	3.1	1.8
	GROUP 1 - ONE DWI ARREST	56	3.4	1.7
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	4.2	2.1
	TOTAL	238	3.5	1.9
	Bartlett's test p= .237			
Harm avoidance scale	GROUP 0 - ZERO DWI ARRESTS	117	9.9	3.8
	GROUP 1 - ONE DWI ARREST	55	9.8	4.2
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	8.9	4.6
	TOTAL	234	9.6	4.2
	Bartlett's test p= .213			
Impulsiveness scale	GROUP 0 - ZERO DWI ARRESTS	120	5.9	3.6
	GROUP 1 - ONE DWI ARREST	55	5.5	3.1
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	6.8	3.8
	TOTAL	237	6.0	3.6
	Bartlett's test p= .316			
Depression scale	GROUP 0 - ZERO DWI ARRESTS	108	6.8	3.6
	GROUP 1 - ONE DWI ARREST	52	7.2	3.3
	GROUP 2 - TWO OR MORE DWI ARRESTS	59	7.8	3.8
	TOTAL	219	7.2	3.6
	Bartlett's test p .572			

Table 4. cont'd...

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
Self-esteem scale	GROUP 0 - ZERO DWI ARRESTS	120	7.2	1.7
	GROUP 1 - ONE DWI ARREST	56	7.0	1.9
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	7.0	1.5
	TOTAL	238	7.1	1.7
	Bartlett's test p= .856			
Aggression scale	GROUP 0 - ZERO DWI ARRESTS	115	7.8	3.0
	GROUP 1 - ONE DWI ARREST	55	7.7	3.1
	GROUP 2 - TWO OR MORE DWI ARRESTS	61	8.2	3.3
	TOTAL	231	7.9	3.1
	Bartlett's test p= .609			
Major life events scale	GROUP 0 - ZERO DWI ARRESTS	108	51.8	9.3
	GROUP 1 - ONE DWI ARREST	51	52.6	10.0
	GROUP 2 - TWO OR MORE DWI ARRESTS	58	56.0	10.7
	TOTAL	217	53.1	10.0
	Bartlett's test p= .496			
Social desireability scale	GROUP 0 - ZERO DWI ARRESTS	120	9.6	3.2
	GROUP 1 - ONE DWI ARREST	56	10.4	3.1
	GROUP 2 - TWO OR MORE DWI ARRESTS	62	8.7	3.1
	TOTAL	238	9.6	3.2
	Bartlett's test p= .983			

Table 5. Group sizes, means, and standard deviations of variables from driving records for three groups of DWI arrests.

VARIABLES NAMES	DWI GROUPS	GROUP SIZES	MEAN	STANDARD DEVIATION
All traffic violations	GROUP 0 - ZERO DWI ARRESTS	115	2.0	2.3
	GROUP 1 - ONE DWI ARREST	52	2.4	2.9
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	2.7	2.8
	TOTAL	224	2.3	2.6
	* Bartlett's test p= .059			
All collisions (transformed)	GROUP 0 - ZERO DWI ARRESTS	115	-1.3	1.3
	GROUP 1 - ONE DWI ARREST	52	- .8	1.5
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	- .7	1.4
	TOTAL	224	-1.0	1.4
	Bartlett's test p= .364			
Speeding Violations	GROUP 0 - ZERO DWI ARRESTS	115	1.4	1.8
	GROUP 1 - ONE DWI ARREST	52	1.3	2.0
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	1.3	1.9
	TOTAL	224	1.3	1.9
	Bartlett's test p= .502			
All Moving Violations	GROUP 0 - ZERO DWI ARRESTS	115	1.7	2.1
	GROUP 1 - ONE DWI ARREST	52	1.9	2.7
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	2.0	2.2
	TOTAL	224	1.8	2.3
	Bartlett's test p= .126			
Collisions without alcohol involvement (transformed)	GROUP 0 - ZERO DWI ARRESTS	115	-1.5	1.2
	GROUP 1 - ONE DWI ARREST	52	-1.3	1.4
	GROUP 2 - TWO OR MORE DWI ARRESTS	57	-1.4	1.3
	TOTAL	224	-1.4	1.3
	Bartlett's test p= .429			

Table 6

Odds Ratios for Strata of the Demographic Variables

	AGE		SOCIOECONOMIC		EDUCATION		MARITAL STATUS	
MAIN VARIABLES	LOW AGE	HIGH AGE	LOW SES	HIGH SES	LOW EDUCATION	HIGH EDUCATION	SINGLE	MARRIED
Frequency of drinking	.85	**.33	.48	.53	.36	**.76	.67	*.29
Most drinks	3.48	*1.82	2.74	2.57	3.91	**1.99	2.33	*3.82
Number of drinks per occasion	3.32	*1.18	2.94	*.99	5.80	**.78	1.98	2.17
Reactions to drinking	2.25	*1.00	2.30	*.73	2.52	*.89	1.68	1.41
Dangerous styles of drinking and driving	1.79	1.97	2.20	2.08	2.33	2.54	2.01	2.84
Driving expressiveness	1.17	2.23	1.00	2.41	1.54	2.12	1.92	1.32
Disrespect for authority	1.24	*3.11	1.00	*4.02	2.60	1.47	1.67	2.41
Impulsiveness	.94	1.56	.94	1.58	1.44	1.27	1.92	*.86
Major life events	2.27	2.58	2.22	2.03	2.34	2.57	1.88	2.27
Social desirability	.61	.50	.88	*.39	.75	*.38	.50	.63

* These interaction terms, between the socio-demographic and main variables, were assessed with logistic regression.
* These interaction terms were significant (i.e., $p<.05$) when added to the full main effects model.

Table 7. Comparisons of means of the entire sample with the means of the cases selected for the final logistic model.

VARIABLE NAMES	MEANS FOR ENTIRE SAMPLE	MEANS FOR CASES WITH NO MISSING DATA
Age	41.7	40.9
Education	4.4	4.5
Most number of drinks in a day	23.9	25.3
Number of drinks on a typical drinking occasion	13.3	13.8
Average number of days drinking per week	5.7	5.6
Reactions to drinking scale	19.6	19.5
Average number of days drinking and driving	8.6	9.1
Dangerous styles of drinking and driving	22.3	20.7
Driving expressiveness	4.7	4.7
Dangerous styles of driving	2.2	2.2
Responsibility	12.6	12.3
Disrespect for authority	3.5	3.5
Harm avoidance	9.6	9.7
Impulsiveness	6.0	6.3
Depression	7.2	7.3
Self-esteem	7.1	7.1
Aggressiveness	7.9	8.0
Major life events	53.1	53.8
Social desirability	9.6	9.4

Table 8. Pearson "r" correlations among the predictor variables.

	SES	Age	Education	Most Drinks	Drinks Per Occasion	Frequency of Drinking	Reaction to Drinking	Frequency of DUI	Dangerous Styles of DUI	Driving Expressiveness	Dangerous Driving	Social Desirability	Responsibility	Disrespect for Authority	Harm Avoidance	Impulsiveness	Depression	Self Esteem	Aggression	Major Life Events
Age	.2631																			
Education	.5786	.0925																		
Most Drinks	-.2076	-.3845	-.1542																	
Drinks per Occasion	-.2580	-.2306	-.1586	.4955																
Frequency of Drinking	.0410	.1566	.0120	-.0610	-.0252															
Reaction to Drinking	.1152	.0410	.0504	-.1707	-.1340	-.0515														
Frequency of DUI	-.1041	-.0871	-.1423	.1400	.2313	.2168	-.1436													
Dangerous styles of DUI	-.2548	-.3029	-.1285	.2757	.1804	-.1520	-.1037	.2006												
Driving Expressiveness	-.1784	-.4037	-.1100	.2548	.2563	-.0028	-.2173	.2083	.2809											
Dangerous Driving	.0095	-.2085	-.0140	.1224	.0727	-.0134	-.2196	.0949	.1711	.4218										
Social Desirability	.2195	.2701	.1910	-.2623	-.2014	.0488	.2700	-.1924	-.2205	-.2998	-.3467									
Responsibility	.0988	.3564	.0677	-.1679	-.1063	.0032	.2945	-.2204	-.2728	-.3282	-.3730	.5099								
Disrespect	-.3063	-.3956	.2696	.3383	.1552	-.0710	-.0911	.2365	.4008	.4425	.3409	-.4044	-.4793							
Harm Avoidance	.0532	.4454	.0056	-.2318	-.1472	-.0264	.0174	-.0426	-.3182	-.3216	-.2157	.1182	.3704	-.3608						
Impulsiveness	-.1295	-.2170	-.1394	.2142	.0682	.0292	-.1495	.1615	.1921	.3011	.4853	-.5547	-.3838	.4402	-.2170					
Depression	-.1353	-.1512	-.0864	.1657	.1163	.0824	-.1694	.1341	.0595	.1924	.1807	-.6087	-.3100	.2527	-.0272	.3510				
Self-esteem	.0510	.1842	.0985	-.1875	-.0736	.0152	.1719	-.0702	-.0487	-.1529	-.1930	.5684	.2103	-.2179	.1058	-.3066	-.6737			
Aggression	-.1892	-.2816	-.1574	.1703	.1291	.0184	-.2143	.1452	.2285	.2504	.3308	-.4717	-.4795	.3947	-.2393	.5717	.3171	-.1744		
Major Life Events	-.1526	-.4241	-.0512	.1614	.1605	-.0231	-.0921	.0776	.2332	.3296	.2004	-.1961	-.2074	.2187	-.3617	.2192	.1763	-.1640	.1925	

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